BIENNIAL REPORT

OF THE

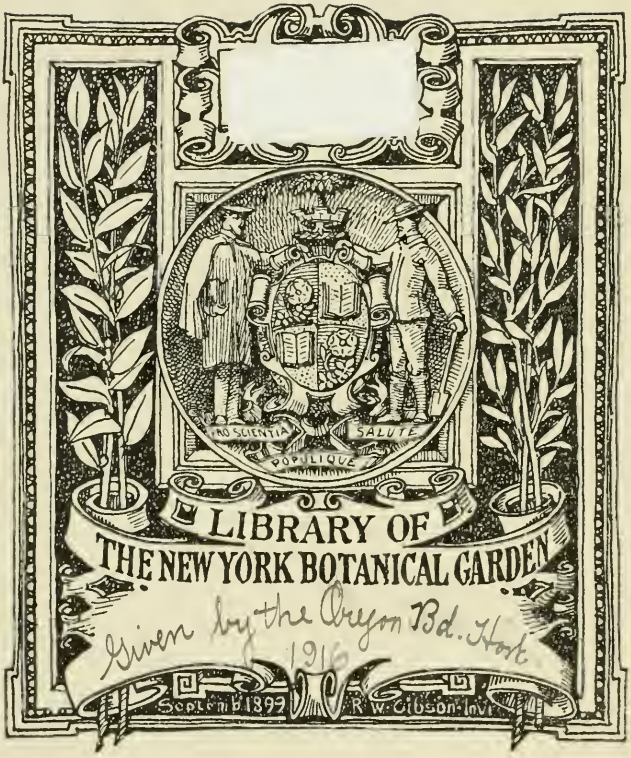
BOARD OF HORTICULTURE

OF THE

STATE OF OREGON

1907

SHOUT
SHARE
IT


PRO SCIENTIA ET SALUTE
REPUBLIQUE
LIBRARY OF
THE NEW YORK BOTANICAL GARDEN
Given by the Oregon Bd. Hort
1916
Sept. 1899
R. W. Gibson, Inv.

A Lake County, Oregon, Spring That Will Irrigate Apple Orchards Some Day

"ALIS VOLAT PROPRIIS"

NINTH BIENNIAL REPORT

OF THE

BOARD OF HORTICULTURE

OF THE

STATE OF OREGON

TO THE

TWENTY-FOURTH
LEGISLATIVE ASSEMBLY
REGULAR SESSION

1907

LIBRARY
NEW YORK
BOTANICAL
GARDEN

SALEM, OREGON
J. R. WHITNEY, STATE PRINTER
1906

LETTER OF TRANSMITTAL.

To the Honorable, the Legislative Assembly of Oregon—

GENTLEMEN: In conformity with the provisions of section 12, horticultural law of 1895, I respectfully submit the ninth biennial report of the State Board of Horticulture, embracing the years 1905 and 1906.

W. K. NEWELL,
President of the Board.

OFFICERS OF THE BOARD.

W. K. NEWELL, - - - - - - - - - - - - - - - - PRESIDENT
R. H. WEBER, - - - - - - - - - - - - - - - - - TREASURER
GEO. H. LAMBERSON, - - - - - - - - - - - - - - SECRETARY

OFFICE: PORTLAND, OREGON.

BOARD OF COMMISSIONERS.

STATE AT LARGE,

W. K. NEWELL, - - - - - - - - - - - - - - - - - GASTON

FIRST DISTRICT,

JAS. H. REID, - - - - - - - - - - - - - - - - MILWAUKIE

SECOND DISTRICT,

CHAS. A. PARK, - - - - - - - - - - - - - - - - SALEM

THIRD DISTRICT,

A. H. CARSON, - - - - - - - - - - - - - - - GRANTS PASS

FOURTH DISTRICT,

R. H. WEBER, - - - - - - - - - - - - - - - - THE DALLES

FIFTH DISTRICT,

JUDD GEER, - - - - - - - - - - - - - - - - - COVE

DISTRICT BOUNDARIES.

FIRST DISTRICT,
Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook counties.

SECOND DISTRICT,
Lincoln, Marion, Polk, Benton, Linn, and Lane counties.

THIRD DISTRICT,
Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake counties.

FOURTH DISTRICT,
Morrow, Wasco, Gilliam, Crook, and Sherman counties.

FIFTH DISTRICT,
Umatilla, Union, Baker, Wallowa, Malheur, Grant, and Harney counties.

REPORT OF E. L. SMITH.

HOOD RIVER, Oregon, October 11, 1905.

Associate Commissioners:

Our horticultural law provides that this Board shall meet on the second Monday of October of each year "for consultation and the adoption of those measures which will best promote the horticultural industries of the State."

Our orchards have produced the present year not more than 50 per cent of a normal harvest, which is to be regretted more especially as our splendid centennial exposition has brought a multitude of visitors from every portion of the country. Oregon, however, is not alone in this respect, and the average production exceeds that of most of our fruit-growing States. In consequence of this shortage, the demand for our fruit is active and the prices most satisfactory to the growers. Oregon apples have obtained a strong hold in European markets, and it is gratifying to note that at a recent sale at Edinburgh, Scotland, Oregon apples sold for $6.25 per box, while those from Australia, which threatened at one time to displace our apples in foreign markets, brought but little more than half this amount. In years of abundance, however, there is safety only in fruits of the highest quality, carefully selected, put up uniformly and in attractive packages. This year the apples of Hood River will largely go out wrapped in paper bearing an attractive cut of Mt. Hood and the name of the Growers' Association. There is no question but that these conditions are greatly promoted by co-operative fruit unions that sell in large quantities, search out the best markets and afford the buyer the assurance of reliability.

LEGISLATION.

Agreeably to the recommendations of your chairman in his report to our recent Legislative Assembly, that body passed an act providing for the appointment of county horticultural

inspectors. It is only necessary for you to visit the fruit markets of Portland to be convinced of the salutary effects of this legislation. The scaly, worm-eaten, fungus-covered fruit, much of it not grown in Oregon, has disappeared, and in its place you will find the clean, sound, healthy product. Prices have advanced greatly to the satisfaction of the careful orchardist, while the slovenly grower has been taught the lesson that he must raise clean fruit or seek some other calling.

It is a matter of the greatest importance that you recommend for appointment for county inspectors experienced fruit growers of conservative judgment, and that the expenses of such inspectors in their respective counties are limited to the lowest amount consistent with efficiency, in order that the county inspectors law may meet with popular approval.

INSECT ENEMIES.

The codling moth and San Jose, or pernicious, scale, continue to ravage our orchards, causing in the aggregate immense loss. At a meeting of the Hood River fruit growers last spring, I recommended the arsenate of lead for codlin moth and all insects that chew leaf or fruit, in lieu of other arsenical poisons. Over 2,000 pounds of Swift's arsenate of lead was used at Hood River, at the rate of two and one-half pounds of the poison to fifty gallons of water, with most satisfactory results. In some instances there were not more than 1 per cent of wormy apples with five sprayings. Its advantages over any combination of lime and arsenic are indeed many, and I do not hesitate to recommend its use to the fruit growers of our State. So numerous were the inquiries in regard to this insecticide that I prepared a circular letter, which I beg leave to incorporate herewith.

HOOD RIVER, Oregon, ..., 1905.

DEAR SIR:—I am in receipt of your inquiry relative to the use of arsenate of lead as a spraying material for the codlin moth, and other chewing insects. The formula for making the arsenate is as follows:

4 oz. arsenate of soda,
12 oz. acetate of lead.

Dissolve in water in separate buckets, pour together, and you have sufficient arsenate of lead for fifty gallons of water, and all you need

to do is to pour your arsenate into the water and stir well. Its advantages over other forms of arsenic are as follows:

First. It remains in suspension longer than any other arsenical spray, and hence requires but little agitation.

Second. It is very adhesive, but little affected by rains, and therefore requires a less number of applications.

Third. It is more pleasant to handle, and can be used any strength without injury to foliage.

The arsenate of lead has been highly endorsed by the University of California, Professor Steadman, entomologist of the State of Missouri, Professor Gillette of Colorado, and many other authorities. In Colorado but three sprayings were used, with excellent results. Professor Steadman recommends four: first, when petals fall; second, two weeks later; third, thirty days after the second; and, fourth, thirty days still later. If used with bordeau, the Massachusetts Station reccommends using only one-third of the arsenate.

The Merrimac Chemical Company, of Boston, send out a paste form of arsenate of lead known as Swift's Arsenate of Lead; and the Bowker Insecticide Company, of New York, a similar preparation known as Disparene, and both have given excellent results. It might be better to use one of these when only a small amount is required, and two and one-half pounds of either will be sufficient for fifty gallons of water, in which they dissolve readily. They sell for about 15 cents per pound in 100-pound kegs.

If you want to make your own arsenate, you should see that the arsenate of soda contains about 47.8 arsenic acid, and the acetate of lead about 58.8 available lead oxid.

In a bulletin of the University of California the wholesale price of the lead is quoted at 7½ cents, and the soda arsenate at 5 cents per pound. I have been unable to get quotations anywhere near these prices in Oregon, but inquiries will be extended. I suggest that your local druggist will probably be pleased to supply you.

Yours truly, E. L. Smith.

The San Jose scale is in importance the second dreaded foe of the orchardist. The females of this pernicious insect can not fly, yet they are remarkable travelers. Coming from Central China, they made their way to the seaboard, crossed the broad Pacific, colonized the Pacific Coast country, crossed the Rockies, and made themselves at home in the Mississippi Valley, extended their travels to the Atlantic Coast where they multiplied incredibly, and may we not presume that some of their progeny are on a visit to their original habitat in China, having in a few years belted the globe. The San Jose scale can never be exterminated by artificial means, as it is

found on many native trees and shrubs, but the loss will be trifling if trees are thoroughly sprayed while dormant, with lime and sulphur, boiled for an hour, and the formula 1-1-4, representing the proportionate parts of lime, sulphur and water, will be found effective.

VISITATION.

On the evening of May 1, I addressed a well attended meeting of fruit growers at the town of Union, and spoke at length as to the value of co-operative fruit unions, and on the 13th of the same month, on invitation of Dr. James Withycombe, assisted at an institute at Medford, and subsequently made a flying visit to Jacksonville and Ashland. Jackson County is at present, and bids fair to be for an indefinite period, the leading fruit-growing county of the State. The orchards are large and as a rule well cared for. Pears are given prominence and the Ashland section produces fine peaches in great abundance. The enterprising citizens of Medford are constructing a railroad to the upper Rogue River country, with ultimate destination Fort Klamath, via Crater Lake. This road will not only intersect a most valuable timber belt, but will also lead to the development of a splendid fruit section—the foothills and benches contiguous to Rogue River.

In September, made a visit to Klamath Falls and vicinity. It does not speak well for the enterprise of our people that the best way to reach this portion of Oregon is through Northern California. The stage ride from Pokegama, the terminus of the railroad that connects with the Southern Pacific, thirty-six miles to Klamath Falls, is most uncomfortable at that season of the year, both rocks and dust being greatly in evidence. There is probably no county in the State on the eve of so great a development as Klamath. Three railroads are striving each to be the first to invade this county, in anticipation of the great commerce that will result from the reclamation of some 200,000 acres of land by the general government. This project is pronounced by the hydrographic engineers the most feasible of any in the United States, and all obstacles in the way of early work have been

Orchard of F. W. Foster, Summer Lake, in the Interior of Oregon

overcome. My visit to Klamath was solely to get a better understanding of the possibilities of that section for fruit culture. In company with Mr. Elmer Applegate, to whom I am greatly indebted, I visited the small orchards in the vicinity of Klamath Falls; found many of the older trees to be seedlings and, owing to an early frost, but little fruit on the trees. In the vicinity of Merrill I was assured that splendid crops of apples had been grown. The elevation of the section being over 4,000 feet, I doubt if it will ever become noted for its commercial orchards. It is certain, however, that many orchards will be found in sheltered locations, producing not only fine apples but pears, and even peaches in more favored localities. In these high elevations summer apples become fall apples and fall varieties keep well into winter. I would suggest the following varieties as being well adapted for the great plateau of Southeastern Oregon, viz: Wealthy, Gravenstein, King of Tompkins, Fameuse or Snow, Northern Spy, Rome Beauty, etc. With the exception of the last named, these varieties are all of high quality, and the last, on account of fine color, finds acceptance in Eastern markets. At Klamath Falls I met well informed gentlemen from Lake and Harney counties and derived much information as to the capability of these counties for fruit growing. Lakeview has advanced to considerable importance in fruit growing, and at Summer Lake conditions are favorable. There is no county in the State that will not supply, eventually, its home consumption of the more hardy fruits.

The importance of this great country of Klamath, Lake, and Harney counties is neither appreciated nor understood. Three California railroads, as I have previously stated, are hastening to secure its trade for San Francisco, but the topography of the country indicates that the line of least resistance for its products would be north and east of the Cascade mountains to the Columbia, and then down that river to Portland and the sea; and it is only by the construction of such a transportation line that our State will be able to control the commerce of her own territory.

The future seems full of promise to our horticulturists. The advent of new lines of railways will greatly facilitate the

distribution of our fruits over wider areas, and additional trans-Pacific steamships will carry our more common grades at a lower tariff to unlimited markets in the Orient, while our fancy products will seek the better filled purses of Europe.

To instruct and popularize best known methods is the duty of this Board, for, as adverse conditions multiply, we become more and more dependent on the scientific investigations of the Experiment Station.

PORTLAND, Oregon, April 9, 1906.

Commissioners, Oregon State Board of Horticulture:

The relation which I have borne to the State Board of Horticulture for the past six years, that of Commissioner at Large and Chairman of the Board, ceases to-day, and I am gratified to state that the horticultural interests of Oregon were never in a more promising condition than at present. It is, indeed, true that the number of orchard diseases and pests have not materially decreased, but we have now well-known specific treatments that regulate and control them.

My recommendation to our Legislative Assembly, embodied in the eighth biennial report of this Board, that a law be enacted providing for the appointment of county fruit inspectors, met with approval and such legislation was enacted.

The beneficial results which have followed the appointment of the county fruit inspectors are too well known to require further mention here. Our State Horticultural Society has blossomed into new life and large auxilliary societies have been organized in different portions of the State.

In the Willamette Valley a campaign of reclamation of old orchards is being vigorously waged, and an increased planting of young trees over previous years is reported. In all the principal fruit growing sections of the State a vast area of young orchards will come into bearing within the next three or four years. In Hood River alone there are about three thousand acres of such orchard, all of which are Yellow Newtowns and Spitzenbergs, estimated to produce three years later four hundred thousand boxes of fancy fruit.

Jackson County, however, is now and likely to remain the leading fruit county of Oregon. It is first in apples, first in peaches, first in pears, and I believe first in grapes. Its orchards are large, well kept, and its growers are up-to-date in all that relates to their industry. Immense planting of young trees has been going on for several years past, and in a few years the output of apples and pears from Jackson County will exceed any estimate we dare make.

Josephine County in a less degree produces most excellent fruit. The grapes shipped to Portland market last season by Commissioner Carson were not excelled by same varieties California grown.

Douglas County has almost limitless possibilities for fruit growing and her prune orchards are among the best in the State.

East of the Cascades, Union, Umatilla, and Wasco counties must be classed among the great fruit growing counties of the State. Oregon has so many counties admirably adapted to fruit growing that it is unnecessary to specialize farther.

It is a matter of congratulation that this Board, after this date, will be so happily constituted for effective work. Your chairman is a man of ability, a practical horticulturist, and of many years service as a member of this Board.

Our new commissioner of the first district, the most important of any in the State, demonstrated, while county inspector of Clackamas and Multnomah counties, that he was fully competent to enforce the statutes made for the protection of our fruit growers.

Gentlemen, I approach the conclusion of this brief report with no little reluctance. For six years I have shared the councils of three members of the Board, Commissioners Carson, Newell, and Geer, and for a briefer period Commissioners Weber and Park. During all this time not the least dissention has arisen, but all the deliberations of the Board were characterized by harmony and courtesy to its chairman, for which he tenders his appreciation.

It is the earnest desire of your retiring president that your future councils may be characterized by like unanimity and your labors of still greater value to our fruit growers and the State.

To the fruit growers of Oregon whose servant I have been for the past six years, I desire to tender my thanks for uniform courtesy and many complimentary expressions of the value of my work. My only regret is that these services were not of greater value.

E. L. SMITH.

REPORT OF PRESIDENT.

Another year has rolled around, bringing to the fruit grower its hopes and fears, rewards and disappointments. To the man who has eyes to see and observe, the lessons of the year have been many. More and more strongly is the conviction forced upon us that only the vigilant, up-to-date man can possibly succeed in the fruit business. With the heavy expense of fighting insect pests, and fungus diseases, with great scarcity of help and high wages, only the best of fruit can pay any profit. We must continue the campaign for better fruit with increased energy all along the line.

The new law providing for the appointment of county inspectors has met with general hearty approval, and now all the important fruit growing counties of the State have their local inspector. And these inspectors, I am most happy to say, are in every instance men splendidly qualified for the work. They have during the past season become acquainted with conditions in their respective localities, and are now ready for an active campaign. Fellow Commissioners, we have now a splendid organization for the advancement of the horticultural interests of the State, and it remains for us now to show results. I urge upon you that you each do all in your power to stir up interest in every way possible, first to get better care for the fruit that is planted, second, better marketing for what is produced, and third, to induce wise selection of fruits for new planting.

Experience of past seasons has shown conclusively that the most effective spraying for general good of the tree can best be done in the fall as soon as the leaves have fallen. The scale is far easier to kill at that time than in the late winter or spring, and that is the only time when the apple tree anthracnose can be successfully treated. Therefore, get your inspectors together at once and instruct them to begin immediately an active campaign to get every scale-infested tree sprayed, or failing that, cut down before another season

opens. Insist upon the use of standard solutions of lime-sulphur and salt, and use your best efforts to see that owners of public spraying outfits give good service at reasonable prices. There has been a great deal of complaint, and with good reason, along this line.

Outside of Hood River and parts of Rogue River valleys, one of the greatest questions confronting the fruit grower is that of marketing. The individual, unless engaged on a tremendous scale, is at a great disadvantage in marketing, no matter how smart he may be. He must pay more for all his supplies, he can not possibly secure as well trained help as though he were one of a number of growers working together. The advantages of union are so obvious that it is superfluous to mention them. Of course a successful union cannot be formed all at once; it must be a matter of slow growth, but encourage growers everywhere to make a beginning; if nothing more, induce two men to order their boxes together; the usual price is 11 cents per hundred, but 500 lots can be had at 10 cents. If only two men can work together one season they will show good results enough to induce two more men to want to join them next year, and then the remainder is easy.

And then, to secure most satisfactory results, there should be uniformity of planting in each locality. The State of Oregon is so diverse in climate and soil that almost every fruit of the temperate zone can be successfully grown, but there are localities in which each particular fruit will succeed perhaps a little better than anywhere else. Find out what fruit will make the best specialty for each locality and induce the growers to produce enough of that fruit to make it an object for buyers to hunt them up. Just in a general way, as an illustration, I would cite the success of Hood River, with its one strawberry and two apples (varieties I mean, not number); Rogue River with its pears and winter apples; Ashland for peaches; the Dalles with peaches, apricots and cherries; Cove with strawberries and cherries, etc.

Every fruit-growing locality should have some specialty; the country around Grants Pass should profit by the example of Mr. Carson and make Grants Pass Tokay grapes famous

to the uttermost ends of the earth. Sections of Douglas County could supply the Northwest with the earliest strawberries; and Clatsop county could keep up the supply where Cove leaves off in late July, and continue until November. There are wonderful possibilities of fruit growing in this fair State of ours.

The work undertaken by the State Horticultural Society last winter, of holding branch meetings all over the State and organizing local societies, has been of great benefit. Let us do everything possible to continue this work. We don't want big meetings with lots of hot air, but meetings of actual fruit growers where some *practical* man can talk and answer questions, and where the most bashful man will not be afraid to talk. There are many matters for us to consider at this meeting. I would like to see some better method of disinfecting nursery stock, and we should if possible secure uniformity in regulations with our sister States on the coast. Then we should have, in my opinion, some law regulating the marketing of fruit packages so that the inspector can have some standard to work by. We can discuss these subjects, and if we can arrange details, I should like to recommend the enactment of such laws to the next Legislature.

In order to give a clear idea of the scope of the work of the Board of Horticulture, I incorporate section 1 of the act of 1895, defining the boundaries of the districts and briefly the duties of the Commissioners:

Section 1. There is hereby created a Board of Horticulture, to consist of six members, who shall be appointed by a Board, consisting of the Governor, Secretary of State, and State Treasurer. One member of the said Board of Horticulture shall represent the State at large and shall be the president and executive officer of the Board, and one member shall be appointed to represent each of the five districts as hereby created, to-wit: (1) The First District, which shall comprise the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook; (2) The Second District, which shall comprise the counties of Marion, Polk, Benton, Lincoln, Linn, and Lane; (3) The Third District, which shall comprise the counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake; (4) The Fourth District, which shall comprise the counties of Wasco, Sherman, Morrow, Gilliam, and Crook; (5) The Fifth District, which shall comprise the counties of Umatilla, Union, Wallowa, Baker, Malheur, Harney, and Grant.

It shall be the duty of the several members of the Board, and the secretary, under their directions, to visit their respective districts and to see that all regulations of the Board and all provisions of law to prevent the introduction or spread of fruit pests and diseases of trees or plants injurious to the horticultural interests of the State are enforced.

The horticultural industry has progressed with rapid strides the past two years. Never before has the general quality of the fruit been so good, nor the financial returns so large. The planting of new orchards goes on continually, until fruit growing bids fair to rival dairying as the leading agricultural industry of the State.

The reports of the Commisisoners of the various districts are published herewith, and they give a detailed account of the conditions in each, but I will briefly summarize to show the value of the fruit crop for the biennial term of 1905-1906. Of course, the difficulty of securing accurate figures on the production of small fruits is recognized by all, but great care has been taken, and these figures are approximately correct.

The total output of the fruit market for the year 1906 is valued at $2,789,160.

The crop of the First District is estimated at $410,000.

The crop of the Second District is valued at $485,000.

Mr. A. H. Carson reports the yield and value of the fruit crop of the Third District for the year 1906 as follows:

Third District	Apples	Number boxes	300,000	$ 375,000 00	
	Pears	Number boxes	125,000	187,500 00	
	Peaches	Number boxes	200,000	120,000 00	
	Prunes (cured)	Number pounds	6,000,000	180,000 00	
	Cherries	Number crates	600	600 00	
	Grapes	Number crates	4,000	5,000 00	
	Strawberries	Number crates	4,000	4,000 00	
	Small fruits	Number crates	8,000	8,000 00	
					$ 880,100 00

Mr. R. H. Weber reports the value of the fruit crop from the Fourth District for the year 1906 as follows:

Hood River—	Apples	Number boxes	230,000	$ 345,000 00	
	Pears	Number boxes	6,000	6,000 00	
	Prunes	Number boxes	6,000	3,500 00	
	Peaches	Number boxes	2,500	1,250 00	
	Cherries	Number boxes	1,500	1,750 00	
	Strawberries	Number boxes	50,000	125,000 00	
	Blackberries	Number boxes	2,000	4,000 00	
					$ 486,500 00

Apples Grown and Packed by Eisman Brothers, Grants Pass, Oregon

Mosier—	Apples	Number boxes	20,000	$ 28,000 00	
	Pears	Number boxes	1,000	1,000 00	
	Prunes	Number boxes	15,000	6,000 00	
	Peaches	Number boxes	3,000	1,500 00	
	Cherries	Number boxes	2,500	3,125 00	
	Strawberries	Number boxes	1,000	2,500 00	
	Plums	Number boxes	4,000	2,000 00	
					$ 44,125 00
The Dalles—	Apples	Number boxes	15,000	$ 15,600 00	
	Pears	Number tons	225	6,750 00	
	Prunes	Number tons	1,200	24,000 00	
	Peaches	Number boxes	40,000	20,000 00	
	Cherries	Number tons	150	21,000 00	
	Strawberries	Number boxes	3,000	6,500 00	
	Apricots	Number boxes	5,000	3,750 00	
	Grapes	Number tons	120	12,000 00	
	Small fruits	Number crates	2,000	4,000 00	
					$ 119,600 00
Sherman County, estimated					8,835 00
Gilliam County, estimated					7,500 00
Morrow County, estimated					7,500 00
Wheeler County, estimated					5,000 00
Crook County, estimated					5,000 00
Grand total					$ 684,060 00

Mr. Judd Geer reports the value of the fruit crop grown in the Fifth District for the year 1906 as follows:

Fifth District -	Apples, number boxes 125,000	$ 150,000 00	
	Pears, number boxes 15,000	15,000 00	
	Peaches	20,000 00	
	Prunes	30,000 00	
	Cherries	40,000 00	
	Strawberries	30,000 00	
	Other fruits	45,000 00	
			$ 330,000 00

These figures speak for themselves and warrant all the effort that is being made to foster the industry.

The law passed at the last session of the Legislature authorizing the appointment of county inspectors, so ably and persistently urged by former President E. L. Smith, has proven a wise measure and vastly increased the efficiency of the work of the Board. Owing to the increased acreage of orchards and the spread of fruit pests and diseases, the work has entirely outgrown the capacity of the Board to handle, and the relief afforded by the appointment of county inspectors was very timely. All of the important fruit-growing counties now have inspectors, and in every case these men are actively engaged in horticultural work, and are splendidly qualified.

A few changes in the horticulture law, made also at the session of 1905, greatly strengthened the law. I give here an account of the cases tried in the courts that resulted in fully sustaining the law.

HORTICULTURE LAWS UPHELD BY THE COURT.

As was inevitable, the strict enforcement of the horticulture law has met with opposition in two cases. The Commissioners and inspectors have been sued for damages for enforcing the law. But in both cases they were completely exonerated and the law upheld.

The first case was that of Sellwood vs. Reid, and grew out of the refusal of Mr. T. A. Sellwod, of Milwaukie, to spray his orchard when ordered to do so by Commissioner Reid of the first district. After repeated warnings and long delay Mr. Reid ordered County Inspector A. J. Lewis, of Clackamas County, to enter the premises of Mr. Sellwood and cut down the trees. After thirty-four trees had been destroyed Mr. Sellwood appeared and agreed to spray the remainder. He then brought suit against Mr. Reid to cover damages. The case was tried before Judge McBride, who in charging the jury said there were three points in this case especially to be considered. First, was the plaintiff legally served with notices; second, were the trees infested, and third, were the trees sprayed in conformity with the notices. It was fully proven that notices were duly served, that the trees were infested, they were not sprayed, and the jury found accordingly.

The second case was that of Broetje vs. Deich, and grew out of coal oiling by Inspector Deich, of Multnomah County, of eight boxes of wormy and scaly apples being offered for sale by Mr. Broetje. Mr. Broetje brought suit to restrain the inspector from further interference with his sales of fruit, claiming that the fruit was not infested, also that the State had no right to destroy his fruit without compensation. The case was tried before Judge Frazer and it was proven that the fruit was badly infested with San Jose scale and the larvae of codling moth. The judge held that the law plainly and expressively prohibited the sale of such fruit, and he decided the case against the plaintiff.

These cases have been watched with great interest by fruit growers in general, and these decisions give general satisfaction. The establishment of the rights of the inspectors to proceed under the law will make it much easier in the future to accomplish our work.

NEW LEGISLATION.

In new legislation but little is needed, but a few points require attention. The first is the regulations of the sale of spraying materials. The purchaser is entirely at the mercy of the dealer in the purchase of spraying materials, particularly in ready-made articles, which are so commonly used. An act should be passed requiring the manufacturer of any prepared spray material to label same plainly, showing the ingredients, and per cent of purity and strength of same, and giving the State chemist authority to make tests of same and conduct prosecutions when necessary. Spraying is expensive, disagreeable work, and it is an outrage on the orchardist to have it all wasted because of worthless materials.

Orchardists now use large quantities of commercial fertilizers, and here again they are subjected to loss by dishonest manufacturers. The State should pass a fertilizing bill regulating the sale of all commercial fertilizers.

MARKING FRUIT PACKAGES.

It would greatly facilitate the work of the fruit inspector in the markets if an act were passed requiring every grower and packer of fruit to stamp each package or box plainly with the name of the variety of fruit and his own name and address. The grower or shipper of diseased fruit could not then disown responsibility.

COUNTY HORTICULTURE SOCIETIES.

Realizing the great benefit of organized co-operative effort in all lines, the Board has, during the past two years, lent all the assistance in its power to the work of the State Horticultural Society in establishing local societies in every fruit-growing center in Oregon. These societies will be of incalculable benefit, first accomplishing the work of cleaning up infested trees, then directing wisely the planting of new fruits, and growing gradually into permanent incorporated unions for the purpose of packing and shipping fruits.

The splendid success of the unions at Hood River, Ashland, Medford, and other places, are good object lessons, and the industry will be on a much more satisfactory basis when

similar unions are established at every shipping point. The buyer will be safe in ordering and the grower will receive better prices and be protected from loss in consigning. The State needs more canneries and commercial evaporators, more cider and vinegar factories. There is too much waste of fruit that might be used.

FRUIT FAIRS.

For several years the Hood River biennial fruit fair has been a notable event, and the movement to follow her example in other parts of the State is a commendable one. Dallas this year had a splendid fruit exhibit, and other places are laying plans for next year. These exhibits attract attention, stimulate rivalry and interest among growers, invite buyers, and widen markets. "May their tribe increase."

It has been feared by many people that the strict enforcement of the laws would raise the price of fruit to such an extent that the poor would be prohibited from buying it. It does not seem that this fear is well founded. Universal spraying means the eradication of fruit pests, clean, healthful fruit for the consumer, and the equality of all producers as to market conditions. The increased cost is only a few cents per box. It is more economical to buy a box of sound, clean apples at $1, than a box of wormy, scabby ones at 50 cents. The proportion of $2 and $3 per box apples is always a very small per cent of the total crop.

SPRAYING.

The codling moth and the San Jose scale, like the poor, we have always with us. They are present in practically every fruit-growing locality in the State, and combating them is one of the principal duties of every orchardist. Rapid progress is being made in the perfecting of power sprayers. There are many makes of gasolene, gas, and steam sprayers now on the market, all of which are giving good satisfaction, and doing much more rapid and efficient work than the hand pumps.

The expenses of such outfits is, however, a heavy one, and it is advisable, where practical, for several small growers to unite in purchasing one. In spraying for San Jose scale the lime and sulphur is still the leading remedy. Several liquid

preparations of this spray are now on the market, and have given good satisfaction where purchased fresh and in sufficient quantities to secure reasonable prices.

For codling moth, the arsenate of lead has practically superceded all other forms of arsenic, because it is easily applied and does not burn the foliage. However, being a new thing the price has been high. Dealers must furnish it at lower rates if it is to remain pre-eminent.

THINNING APPLES.

Every grower recognizes the fact that the wormy apples are where the fruit hangs in clusters. It is impossible to get spray in between the apples, but the worm can pry his way in and bore into one or both apples whenever two are touching. The only way to avoid this is to thin the apples by hand when they are about the size of hazel nuts. They can then be picked off readily at an expense of 10 to 50 cents per tree, and the benefits are many. The fruit can be kept clean, it will all be of good size, and the tree will not break down from overloading, and by no means least, every apple will color up properly. By all means, apples, pears, and peaches should be hand thinned whenever a full crop sets in the spring.

The success of Mr. A. I. Mason, of Hood River, this year in this line is worthy of note. Every tree was hand thinned and thoroughly sprayed all season, and the result was only sixty-four wormy apples in 1,100 boxes, by actual count, or less than one-half of one per cent. The per cent of small apples was equally trifling.

WALNUT GROWING.

Interest in nut growing is manifested on every hand. Many very large plantings of English walnuts are being made, and nearly every horticulturist is planting at least a trial orchard. While the walnut will unquestionably succeed if proper varieties are planted in suitable soil, it is just as well to use a little caution in being sure you are right before going ahead.

This volume contains a splendid article by Mr. Henry E. Dosch on walnut growing, covering every phase of the subject, and embodying all the information we have on the sub-

ject, and it should be read by every intending grower. Mr. J. B. Pilkington also contributes an interesting article on nuts in Europe. The result of his observation while there.

THE INLAND EMPIRE.

It has long been recognized that all parts of Oregon touched by the railroad was good fruit country, but the opinion is prevalent that the great Inland Empire, lying between the Cascade Mountains on the west and the Idaho line on the east, the California and Nevada line on the south, and the line of the O. R. & N. Company on the north, is fit only for cattle and sheep range; that it can never be a land of homes and small farms because it will not produce fruit and vegetables. I have long believed this opinion to be erroneous, but never had opportunity to prove it until this year. Believing that the importance of this wonderful tract of country, the largest in the United States without a railroad, warrants every effort being made to develop it, I have this year traveled pretty thoroughly over Sherman, Crook, Lake, and Klamath counties with a view of determining the possibilities of fruit growing. The result is certainly encouraging; practically everywhere that any intelligent effort has been made to grow fruit the attempt has met with success. Notwithstanding that the elevations range all over this country from 3,000 to 4,500 feet above sea level, there are apple trees growing around nearly every farm house where the owner has had interest enough to plant them and provide water for irrigation and a few poplars for a wind break and protection from frost.

Of course, the country is frosty now, but as it becomes settled and the valleys are irrigated and alfalfa fields succeed to sage brush and grease wood, the climate will change, as it has in every other immigrated country because less frosty and liable to sudden changes, and fruits and vegetables will be produced in abundance. In early days it was said the Yakima and Grande Ronde valleys were so frosty that nothing would ever grow there. Look at them now; garden spots of the world. The ability of green vegetation and water from irrigation ditches to lessen frost in these semi-arid regions is something amazing. The ability of fruits to adapt themselves

to climatic conditions is equally surprising. No one need be deterred from settling in this country because of inability to grow fruit.

On the Deschutes, at the new town of Redmond, barely a year old, this year all kinds of vegetables, including melons and tomatoes, and small fruits were produced. The young orchards planted are thriving well.

SUMMER LAKE.

Along the western shore of Summer Lake, Lake County, the orchards are already quite extensive and many trees will be planted this year. Nature has poured out her blessing most bountifully on this favored spot. A warm stretch of very fertile soil one-half to two miles in width and twenty-five miles long, protected by the Rim Rock Mountains, 2,000 feet high, and tempered by the waters of the lake, covering some eighty square miles. The conditions for growing fruit are ideal. The soil is all sub-irrigated, and springs, both hot and cold, are abundant. The trees are somewhat slow in coming into bearing, but when once they begin are regular and persistent, and the quality is unexcelled by any land. The peaches grown here are said to be remarkably fine. Insect pests are as yet unknown, and it is to be hoped that they can keep them out by care in importing trees. Trees grown under similar conditions, farther north, are the best ones to plant in this region.

In the Klamath country, also, the new settlers are showing the greatest interest in fruit culture, and are planting fruit gardens extensively, with every promise of success. Given transportation and people, and no one would dare predict the wonderful future of this region. The timber alone will make it wealthy.

The nursery men report an unprecedented demand for trees, particularly standard apples, and the supply promises to be exhausted before spring. Nursery stock is carefully inspected by the Commissioners, and it is only just to say that in nearly all cases the inspector is welcomed by the nurserymen, who are anxious to send out only clean stock.

The Board is indebted to the officers of the Experiment Station at Corvallis, and to many horticulturists all over the State, for invaluable aid in editing this volume.

To avoid any conflicting advice, the preparation of the matter regarding insects, fungi, and spraying has been left entirely in the hands of Professor Cordley, who has given here the latest knowledge obtainable, and the soundest advice as to its application.

The fame of Oregon fruit will grow with the years, her lands will become yet more valuable, and her people will acquire peace and contentment.

W. K. NEWELL,
President of Board and Commissioner at Large.

GASTON, Oregon, October 1, 1906.

Hungarian Prune Tree Orchard of R. H. Weber, The Dalles, Oregon

REPORT OF COMMISSIONER FIRST DISTRICT.

Dilley, Oregon, March 31, 1905.

To the President and Members of the State Board of Horticulture:

The season of 1905 bids fair to be a very favorable one for the Oregon fruit grower. In spite of two or three very severe frosts during the latter part of March, there was but little, if any, real injury done. Some early cherries and plums were nipped, doubtless, but it is believed there were plenty escaped to make a bountiful crop. The prune, in the later blooming localities particularly, had very fine weather for the period of full bloom, and it is believed that a full crop of this fruit is assured. Trees of all kinds are thrifty and vigorous, and are blooming full and strong.

Market prospects are also encouraging; the prune, after several years of discouragingly low prices, seems to be picking up in price once more and promises some remuneration to the grower. The market is practically bare of Italian prunes now, and it is reliably reported that not more than 15,000,000 pounds of California prunes are now on the market. This quantity will be easily consumed ere the new crop comes on, leaving a clean market for the new goods.

Let us give our trees good care, and produce as much as possible, only the large sizes, then dry carefully and market wisely, and prune growing will remain one of our prominent industries.

A considerable number of prune trees have been planted during the season, and one or two years of good prices will stimulate planting greatly.

The greatest interest in horticultural lines at the present time is in walnut growing. The agitation started a few years ago by that genial enthusiast, Mr. Henry E. Dosch, has borne great fruit, and now people all over the country are planting walnuts; anywhere from one tree to a hundred acres. It certainly looks as though walnut growing would

prove a success in this country, but I should dislike very much to see a boom, such as we had a few years ago with the prune. With the greatest care in choice of land and trees, there are certain to be many unsuccessful plantings, and a boom would result in indiscriminate planting, with consequent loss and dissatisfaction. Persons intending to plant nut trees of any kind should investigate carefully before planting, for mistakes will be hard to remedy later.

Planting of pear, apple and cherry trees continues steadily. It seems to me likely that the local supply of small fruits this season will be somewhat short of the demand, and prices should certainly rule firm.

The Lewis & Clark Fair this year offers a great opportunity for Oregon fruit growers to advertise, and we must make an earnest, united effort to show our fruits of all kinds, and also to give all interested visitors accurate, reliable information. Taken as a whole, the prospects are that 1905 will be a banner year.

PORTLAND, Oregon, October 9, 1905.

To the President and Members of the State Board of Horticulture:

Since our last meeting in April, my time has been largely taken up by my duties as superintendent of horticulture for the Lewis and Clark Exposition; having served in that capacity from May 15 to September 15.

The fruit crop in my district is not very heavy this year. The apple crop being the lightest in years. The cause seems to have been the extremely dry summer of last year; the trees at that time bearing a full crop, and could not apparently get moisture enough to set strong fruit buds at the same time.

The prune has yielded about two-thirds of a normal crop this year; quality is very good and prices are better than for several years. Prune growers are encouraged and considerable planting will be done this coming season.

The cherry crop was fair in quantity and most excellent in quality; probably the finest the State has ever produced. Of

all our fruits shown at the Exposition the cherries attracted the most attention. Their size and delicious flavor were a revelation to the Eastern and California visitors. Professor VanDeman pronounced the Oregon display of cherries the finest ever shown anywhere.

The grape crop is an average in yield, and very fine in quality, but the recent heavy rains have caused a great deal of injury, and probably a considerable part of the crop will not be marketed.

Pursuant to the provisions of the amendment to the horticultural law passed last winter, the fruit growers of Multnomah and Clackamas counties petitioned for the appointment of a county inspector. I recommended the appointment of James H. Reid, of Milwaukie, as inspector for both counties, as one man could handle both and thus lessen the expense quite materially. I am glad to say that Mr. Reid has been doing splendid work, and that scaly and wormy fruit has been practically shut out of the Portland market. Every fruit producing county should have a local inspector and I shall endeavor to have them appointed in the other counties in my district.

1905 FRUIT ESTIMATE.

	Amount.	*Value.*
Apples	50,000	$ 50,000 00
Prunes	2,000,000	90,000 00
Pears	20,000	15,000 00
Peaches	----------	25,000 00
Cherries	----------	30,000 00
Grapes	----------	35,000 00
Strawberries	----------	90,000 00
Small fruits	----------	45,000 00
Total	----------	$ 380,000 00

PORTLAND, Oregon, April 9, 1906.

To the President and Members of the State Board of Horticulture:

I herewith submit my report for the semi-annual term ending March 31, 1906. I am very glad to report that conditions are more encouraging than ever before. The spirit of

cleaning up prevails everywhere, and more pruning, spraying, and cultivating has been done than for years past. A county inspector has been appointed in every county in my district save Tillamook, where the fruit interests do not yet warrant the expense. Local horticultural societies have also been formed in every county, to work in conjunction with the State society and with the Board of Horticulture. We are now splendidly organized to carry on an aggressive campaign against the pests and diseases. Meetings have been held during the winter in almost every fruit-growing locality in the district, and have been addressed by the best authorities obtainable, giving thorough instruction in every detail of orchard work. And never before has such keen interest been taken in the matter of fruit growing.

The past year has apparently been a very favorable one for the spread of the San Jose scale, as that pest has certainly spread very rapidly during the year; the fact that it has spread so rapidly has aroused people to the danger and to the necessity of putting up an organized fight against the pests in general.

My observations lead me to believe that much more effective work in spraying for San Jose scale can be done in the fall than in the spring or late winter. By beginning spraying just as soon as the leaves fall one can catch the greater number of the insects before they become encased in their scales and established under protection for the winter. In fact, I believe that a great deal more orchard work can be done to good advantage in the fall, pruning as well as spraying.

The severe freeze that came so unexpectedly in March did some damage to early cherries and strawberries, and possibly to other fruits also, but it is yet too early to tell, as fruit buds that are injured may not show any damage until the fruit begins to set, when it will fall off for lack of vitality. But I am inclined to think that the later, hardier fruits are not injured, and that we should have good crops during the coming season.

In the matter of spraying I find that there is still a great deal of confusion among many people in regard to the kind of spray to use. I think we should try as much as possible to

simplify matters and recommend that every one use the lime sulphur and salt spray, and that only during the winter season, and the arsenate of lead for codling moth during the summer. There is no use in confusing people by recommending a great number of sprays.

There is great interest taken in the matter of planting walnuts, and I feel like again warning people against carelessness in the selection of soil and trees. Many mistakes were made in planting prunes during the boom of prune planting, and the same thing is being done with the walnut. I believe that the walnut for real success will require just about the same conditions as the prune, and that where prunes have failed walnuts should not be planted. A little forethought will save a great deal of later regret.

W. K. NEWELL,
Commissioner First District.

REPORT OF COMMISSIONER THIRD DISTRICT.

GRANTS PASS, Oregon, March 31, 1905.

To the President and Members of the State Board of Horticulture:

I respectfully submit the following report of the horticultural outlook for the third district, from October, 1904, to April 10th, 1905:

The great apple crop of the third district for the fall of 1904 was marketed during early fall and winter at most satisfactory prices to the growers. The profits from all bearing orchards were so satisfactory to the growers that apple tree planting in the Rogue River Valley in the vicinity of Medford, Central Point, Talent and Ashland, has been stimulated to a wonderful degree. I feel sure that when I say there were three thousand acres planted to new orchard the past winter in Jackson County that my estimate is a conservative one. Of this acreage planted the past winter, 75 per cent were apples, mostly Yellow Newtown, Spitz and Jonathan, and 25 per cent to the pears.

Climatic conditions during the past winter were very favorable for all kinds of orchard work, and a greater amount of work has been done, such as pruning, spraying, plowing, and getting the orchards in prime condition, than during a like period in the history of the industry.

Trees of all kinds, young and old, have wintered in fine shape, and as spring quickened growth, the vigorous conditions of the trees, with their profusion of bloom, warrants me in saying, if climatic conditions continue, the Rogue River and Umpqua valleys will harvest the largest crop of all kinds of fruits in the history of the industry.

There have been no extremes of temperature during the winter. The lowest at any time the thermometer showed during the winter was 22 degrees above zero, in February, and since that date we have had no frost to injure the most

tender plants. The spring and blooming period of all fruit trees were three to four weeks earlier than normal years. This fact caused some solicitude among the growers, but thus far this solicitude has proven groundless.

The apple anthracnose continues to yield to the bordeaux remedy, if applied immediately after the fruit is gathered in the fall. Last year this fungus was very bad in the H. B. Miller orchard, two miles west of Grants Pass. This orchard was sprayed with bordeaux early last fall, and at the present date there is no indication of any new growth of the fungus.

There can be no question but what bordeaux, if sprayed on the apple tree early in the fall, is a specific for the apple tree anthracnose.

In Jackson County the apple and pear industry is bound to expand and grow largely during the next few years, as a railroad is now being built from Medford up Rogue River to the Crater Lake Reserve, to tap and haul out the four billion feet of sugar and yellow pine known to be in that timber belt, and as there are thousands of acres of choice apple and pear lands lying adjacent to this railroad, the question of transportation will not deter apple growers any longer from invading and planting this rich territory. Medford is and always will be the center of the great apple and pear section of the Rogue River Valley.

1905 FRUIT ESTIMATE.

	Amount.	*Value.*
Apples, number boxes	75,000	$ 112,500 00
Prunes, number pounds	800,000	32,000 00
Pears, number boxes	40,000	80,000 00
Peaches, number boxes	130,000	65,000 00
Cherries, number crates	500	500 00
Grapes, number crates	5,000	5,000 00
Strawberries, number crates (15 pints to crate)	6,000	6,000 00
Small fruits, number crates	15,000	12,500 00

The fruit crop of the third district was small this year. For what we did have prices ruled high. Fancy packed pears sold in the New York market at prices that only an insurance officer or a bank president could indulge. I have data that a number of cars sold for in New York which I will give in my semi-annual report.

I think our very short crop this year was owing more to the extreme drouth than any other cause. Think of only 800,000 pounds of prunes, only 10 per cent of a normal crop.

GRANTS PASS, Oregon, April 9, 1906.

To the President and Members of the State Board of Horticulture:

I respectfully submit the following as my semi-annual report for the third district:

The past winter, 1905-06, has been a very active season for the fruit growers of the third district. With the planting out of new orchards, pruning, and spraying the old orchards, the fruit men of the Rogue River Valley have had but little time to discuss economics, or the possible working of the outcome of the primaries. With respect they shake the glad hand of the candidate, excuse themselves, and hasten to grasp the spray rod.

During the winter of 1905-06, there has been 3,000 acres planted to apples and pears in the vicinity of Medford, Central Point, and Ashland. About 70 per cent of this acreage was planted near Medford. Of apples the leading varieties planted were Newtown, Spitzenbergs, and Jonathan, and the leading pears planted were the Comice, Bunear Bosk, Bartlett and Winter Nellis. There is at this date 12,500 acres of apples and pears planted in orchard in Jackson County—the greater per cent being in the vicinity of Medford—the center of the apple and pear industry of the Rogue River Valley.

It may be asked, what stimulates the planting of so many large orchards for commercial purposes in Rogue River Valley? This is a pertinent question, and my answer is, the climate and soil of the Rogue River Valley is congenial to the growth of the apple and pear.

It has been found that there is no section of the United States that apples and pears are grown that the shipping qualities of the fruit compare with those grown in the Rogue Valley. Apples packed at Medford and shipped to European markets always arrive in condition. Pears to New York,

Bartlett Pear Tree, Orchard of R. H. Weber, The Dalles, Oregon.

Boston and other Eastern markets, the same. Then, too, they always sell for top prices.

To illustrate the selling qualities of Rogue River fruit I cite a few sales made last fall by Medford fruit growers in Eastern markets. The following prices tell the story and answer the question—What stimulates the planting of so many large orchards in the Rogue Valley?

J. W. Perkins, of Medford, Oregon, sold in New York one car Comice pears, packed in 25-pound boxes, that brought him $2,700 net.

Clay & Meader, of Medford, sold one car Comice pears in New York for $6.50 per box (50-pound boxes.)

E. J. DeHart, of Medford, sold one car Bewnea De Anjou pears in New York for $6 per box.

Gordon Voohies, of Medford, sold one car of Bartlett pears in Montreal for $4.30 per box.

A. D. Helms, of Ashland, sold 4,200 boxes Yellow Newtown, four-tier apples, f. o. b. Ashland, for $1.50 per box. This yield was from five acres eleven years old, irrigated.

Spraying for scale the past winter has been greater and more done than for many years. Through the activity of the county fruit inspectors there has been much done to awaken the grower to the necessity of spraying his orchard if he would make his orchard profitable.

Public sentiment during the past year has greatly aided the Commissioner and county inspectors in having orchards sprayed for scale. Without public sentiment favors the enforcement of the law it is hard to accomplish what one should along the line of cleaning up scale-infested orchards. The system of education practiced by this Board has accomplished much in popularizing the drastic measures of the law. I believe now, in my district, convictions under the law could be had should a grower neglect to spray on order of the Commissioner or the county inspectors. Several years ago when I threatened to enforce the law, some of the leading growers of the valley insisted that convictions could and should not be had, that now insist that the law be enforced vigorously. This fact shows a healthy sentiment in favor of clean fruit. The majority of the growers have learned that there is a specific in a vigorous use of the spray pump, together with the use of the formulas prescribed for exterminating insect

pests and fungus diseases published in the bulletins of this Board.

The building of new railroad lines in Jackson and Josephine counties this year will open up many thousands of acres of horticultural lands in both counties. The railroad from Medford up Butte Creek Valley to Crater Lake makes many thousands of acres of choice apple and pear lands available for planting in that rich section. Some ten miles of this road is already completed.

The Grants Pass & Coast Railway, on which work will begin May 1, will open up the rich apple lands in the south part of Josephine County. In the Illinois and Succer Creek valleys there are thousands of acres of choice fruit lands that will be developed on completing this railway.

There is no doubt a class will say, the question of over-production will cause a halt in the extensive apple and pear planting that has been done in the Rogue River Valley the past two or three years. This question of over-production has always been a hobby since the first apple was picked in the Garden of Eden, and given by Eve to Adam. Adam, perhaps, thought the business had been over-done, and many of his descendants yet stick to that idea.

GRANTS PASS, Oregon, October 1, 1906.

To the Honorable President and Members of the State Board of Horticulture:

I respectfully submit for your consideration my biennial report for the biennial year ending December 31, 1906, as Commissioner of the third district of Oregon, embracing the counties of Coos, Curry, Douglas, Josephine, Jackson, Klamath, and Lake—that subdivision of our great State known as Southern Oregon.

The third district has an area of 26,000 square miles, and is drained by the Coos, Umpqua, Rogue, and Klamath rivers, with many large streams that are tributaries to these rivers.

Along all of these rivers and tributaries are many thousands of acres of rich alluvial soils that are proving very val-

uable for any and all kinds of fruit growing their fortunate owners choose to plant.

The foothills along these streams and valleys are all choice fruit lands. There are thousands of acres of these foothill lands that are adapted to growing the peach, prune, apple, pear, and all kinds of small fruit. These foothill lands are especially adapted to growing the grape, both the American and foreign varieties. The American varieties of grapes grown on these foothill lands are in size and flavor equal to the same grown in Western New York. Eastern grape growers ship cars of Concords annually to the Pacific Coast that could and should be grown here. All choice foreign varieties of grape, wine and table, that are grown in California are grown here to perfection. The Muscat, Flame, Tokay, Malvoisee, Emperor, Black Prince, etc., all are grown here, and are sure for a crop every year. Grapes of all varieties are grown in Southern Oregon without irrigation, and thoughtful men are now giving the grape attention and large commercial vineyards are being planted.

APPLES AND PEARS.

At the present Jackson County, the largest apple and pear county of the State, has 12,000 acres planted to these two fruits. This coming winter Jackson will add 3,000 acres of new planting to this acreage of apples and pears. The productiveness, with superior quality of the apples and pears, together with their shipping qualities and high prices they bring in Eastern and European markets, is stimulating the planting of new orchards each year.

The leading varieties of apples planted is the Yellow Newtown and Spitzenberg, and their quality is superb. Eastern dealers seek the Spitzenberg for their fancy trade, and all first grade of this apple sell high. Last week Mr. Washburn, near Table Rock in Jackson County, sold his first grade Spitzenbergs for $4.50 per box, delivered f. o. b. Tolo station, on Southern Pacific Railroad. This lot of apples goes to New York. What the millionaires there pay for them we can only guess.

When we consider that the United States this year has produced the largest crop of apples in her history, with the best of Eastern grown apples selling in the orchards for $1 to $1.50 per barrel, equivalent in quantity to two and one-twenty-first of our boxes, the sale of fancy Spitzenbergs here for $4.50 per box is remarkable.

This fact should teach the grower that if his locality can grow a superior quality that our best markets demands at fancy prices, he should produce the *best* of that which does the best in his locality.

There is never an over-production of the *best* of any kind of a crop of fruit, be it a large or small crop. The fruit grower that produces the *best* apples, pears, peaches or strawberries does not have to look for a buyer. The demands of all our markets want the *best,* and they seek the grower that has it.

Mr. J. W. Perkins, of Medford, last year sold a car of Comice pears in New York, for which he received $2,700 net —the largest sum of money for which a car of pears ever sold in any of the markets of the United States. I have been asked what was the secret of Mr. Perkin's ability to place a car of pears on the market that would sell for so much money. My answer is, Mr. Perkins' pears were the *best* car of pears ever sold in New York, and they were packed the *best.* Many wealthy people in all of our large cities do not consider the price of an article in buying, if the quality is the best.

Clay and Meador, of Medford, sold one car of Comice pears in New York for $6.50 per box of fifty pounds.

Mr. E. J. DeHart sold from his orchard one car of De Anjou pears in New York for $6 per box.

Mr. Gordon Voohies, of Medford, sold one car of Bartlett pears in Montreal for $4.30 per box.

It will be noted that the prices that these pears sold for are high. There was a short crop of pears last year, which was one of the factors that had a tendency to high prices. The real cause of such high prices was the fact that the pears were of superb quality. They were better pears than are grown in any other section of the United States, and the growers who

shipped them to market packed them neatly, and decorated their pack artistically.

These superb pears, had they been packed carelessly and slovenly, would not have sold for half the money, or possibly might have brought a loss to the shipper had it not have been for the neat packing.

The fact I desire to impress on the fruit growers is: It matters not how superb a quality of fruit you may grow. You can not sell it for fancy prices unless it is properly packed. The grower can not be too careful of his packing if he desires the greatest success. The packing must be honest, it must be artistic. The top, bottom and middle of your package must all be of the same grade, and truly labeled, then you can sell your fruit for top prices.

The days of the stovepipe packer are passed. The trade can not be fooled with any profit to you. If you pack a good quality of fruit carelessly, slovenly, and dishonestly, you are sure to be the losser.

Of the 12,000 acres planted to the apple and pear in Jackson County, about 20 per cent of that acreage is in bearing. When these new orchards are in bearing it will call for skilled, careful, thoughtful handling to produce the best quality of fruit, that will sell for fancy prices in the Eastern and European markets. Only the fancy apples and pears can stand the transportation to these markets at a profit to the grower. The growing of high grade apples and pears is with the grower. Neglect of the orchard, in any of the details, such as spraying, pruning, thinning of over-bearing trees, and cultivation means a loss to the grower.

IRRIGATION.

We have object lessons in the Rogue River Valley that intelligent irrigation adds much to the superior quality of apples and pears. Too much water on lands that have a heavy clay sub-soil would be injurious to the fruit, as well as the growing tree. Therefore, the amount of water required to properly mature an apple and pear crop, and not injure the fruit or tree, must be carefully noted. A porous soil, with a loose, gravelly sub-soil, will require more water than a clay

soil with a heavy clay sub-soil. Irrigation on any and all soils, after the water is taken off, should be followed up with cultivation, and water not again applied until the necessity is indicated by the growth of the fruit and tree.

ARTESIAN WATER.

Through the enterprise of Mr. M. Pellett, of Ashland, Oregon, who owns a large orchard near Talent, it has been demonstrated that the Rogue River Valley is an artesian belt. Mr. Pellett had a well drilled this season at his orchard, and at a depth of 800 feet developed a flow of water that measures forty miner's inches. Mr. Pellett's success has stimulated others to drill for water in the valley, and now there are two more wells being drilled. Next year there will be many wells drilled throughout the valley.

LABOR.

The labor problem is one the orchardmen of Rogue River Valley will have to think of in the near future. At the present labor to gather and pack the apples and pears is none too plenty, although good paying wages are offered by the orchardmen. All of our valley towns have plenty of young men, without visible means of support, standing on the street corners, or loafing in saloons, that can not be induced to earn an honest dollar picking apples or pears. Such support as this class do get, if they do not steal it, no doubt had from the toil of some good old mother over the washtub. Were it possible under our republican form of government, I would favor a vagrant law that would compel this class to earn their support by honest, honorable work or send them to the rock pile under guard of the State and improve our public roads with forced labor from these drones. The building up of the various industries of a great State requires that all its able-bodied men should contribute to its upbuilding.

CROP ESTIMATES.

The biennial year ending September 30, 1904, the third district produced fruits of all kinds valued at $1,390,000.

The year 1905, owing to various causes, the apple, pear, peach, and prune crops were short. The quality was good, and prices ruled high. For 1905 the third district produced:

75,000 boxes of apples, valued at	$125,000
800,000 pounds cured prunes, valued at	32,000
40,000 boxes of pears, valued at	80,000
130,000 boxes of peaches, valued at	65,000
500 crates of cherries valued at	500
5,000 crates of grapes, valued at	5,000
6,000 crates of strawberries, 15 cups, valued at	6,000
15,000 crates of other small fruits, valued at	125,000
Total for 1905	$313,500

From careful data gathered from the whole district, the following estimate of production and value, based on prices being paid, will not be far from the output for 1906:

300,000 boxes of apples, value	$ 375,000
125,000 boxes of pears, value	187,500
200,000 boxes of peaches, value	120,000
6,000,000 cured prunes, value	180,000
600 crates of cherries, value	600
4,000 crates of grapes, value	5,000
4,000 crates of strawberries, value	4,000
8,000 crates of other small fruits, value	8,000
	$ 880,100
Total value of crop for 1905-06	$1,193,600

t will be noted that the value of the crop for the years -1904 were greater than the value of the crop of 1905- by $196,400. The reason for the shortage is: First, cres of new orchard not yet in bearing; second, short cro 1905; third, heavy rains during the period the berry lost being gathered, and many thousands of crates were

SAN JOSE SCALE.

The orchard scale continues one of the serious pests of the continue annual loss from this pest is large and will til every owner of an orchard realizes that

his protection from this loss is one of his own neglect. He can prevent this loss by spraying each year with the lime sulphur and salt compound. This compound will, if made as prescribed by this Board's bulletins, and put onto the infested tree thoroughly, clean it of all scale. Every limb and twig must be sprayed and treated with the compound to do good work and have clean fruit the following season.

It is a safe estimate to say that 25 per cent of the apple and pear crop is lost each year to the aggregate production of the district. The greater part of this loss falls on the smaller orchardmen, or the class who have planted five or ten acres for speculative purposes. The commercial orchardmen do not have this loss. They are by far too good business men to permit such a loss in their business ventures, when they can prevent it by spraying annually at a nominal cost. The men who have this loss through the scale show how unwise they are. They plant out a small orchard and expect profits in proportion to their acreage with the commercial men, who do make big interest on their investments, without bestowing the labor.

To grow fruit of any kind at a profit is a business matter, and any good business man will tell you that to achieve success you must use your brains with plenty of hard work.

The codling moth is another serious pest, and the loss is great each year. The same class of growers that lose from the scale sustain the most of the loss from the moth. place of losing 40 or 50 per cent of an apple crop each y the grower can by using arsenate of lead and spray his as three to four times during the season, have from 95 per cent of sound apples free of worms at gathering

COUNTY FRUIT INSPECTORS.

The law of 1905 providing for the appointment of County fruit inspectors by the County Court of each coun- has been of great benefit in this district. There are miles. ties in the district, containing an area of 26[illegible] cover all It was impossible for the District Commi[illegible]lowed him. of this territory each year with the [illegible]oner, the in- Under instructions from the District

Block of Yearling Cherry Trees, Russellville Nursery, Oregon

spectors in Jackson, Douglas, and Klamath counties have been active in teaching the growers the best methods of spraying, pruning, and cultivating their orchards. They also have been active in inspecting fruits of all kinds in the local markets, and have prevented dealers from selling fruit infested with injurious pests. At present, dealers are handling, through this county inspection, much cleaner fruit than last year. A rigid enforcement of the law in regard to the sale of infested fruit will do more to cause the negligent to clean up their orchards than any one thing that can be done. When the grower finds he can not sell his infested fruit at any price, he who is so negligent and careless of the reputation of the fruit industry of the State should be at the whole loss. He must spray, and clean up his infested orchard, or his orchard will give him no returns. If he does neither, the law should in his case be enforced. His infested orchard should be destroyed by the State, and the expense of the State's doing the work become a lien on his land as the law provides.

I know the question has been raised through the press that this scaley, wormy fruit has an edible value, and a rigid enforcement of the law deprives the poor of cheap fruit. There is false charity raised by this question. In this State there are millions of capital invested in orchards. This investment should have protection. By protecting to the extent possible the painstaking, working orchardman from the negligence of the ignorant and shiftless, we can build up an industry that means millions to the people of this State each year. By protecting the industry we increase the productive capacity of our orchards, which demands labor at good paying wages, which the able-bodied poor can take advantage of if they will.

FIELD WORK.

During the past two years, have visited personally a greater portion of the orchards of the district, and can see they are making progress in bettering their methods of care and cultivation. Have had many letters from all parts of the district on many topics relating to the care and management of orchards, and have carefully answered the same.

Have mailed to the fruit growers 600 volumes of the eighth biennial report of this board.

APPLE ANTHRACNOSE.

This disease of the apple tree yields so readily to spraying with bordeaux, just after the apples are gathered in the fall, that the apple growers cease to fear it as they did four and five years ago.

This coming fall and winter it is my purpose, as well as the county inspectors, to be active in the enforcement of the law relating to injurious insect pests. Public sentiment is educated at the present on the line of law enforcement, and should it be necessary for me or the inspectors to resort to enforcement of the law through the courts, I feel sure the majority of the fruit growers will sustain us.

EISMAN BROTHERS.

This orchard is located four and one-half miles west of Grants Pass, on the north bank of Rogue River. Thirty-five acres of this orchard was planted about fifteen years ago, and owing to anthracnose and scale, of which it became infested, was practically given up and abandoned until about six years ago, when Eisman Bros. took hold of it with determination to clean it up and bestow care intelligently on modern lines. The orchard up to six years ago had been unproductive. Eisman Bros. bought a first-class power spraying rig, pruned and sprayed the orchard thoroughly, and in 1904 sold $12,000 worth of apples from this orchard. The year 1905 the crop in this orchard was short, yet they produced about $2,000 worth of apples. To show the production of this orchard this year, 1906, I herewith submit a written report which I requested of Eisman Brothers.

GRANTS PASS, Oregon, October 27, 1906.

A. H. Carson,

Horticultural Commissioner, Third District:

Inclosed please find four photographic views taken in our orchard this year.

Our apple crop this year will amount to 14,000 boxes; 5,000 boxes Yellow Newtown, 4,000 boxes E. Spitzenberg, 2,000 boxes Ben Davis,

the remainder Baldwin, Winesap, R. I. Greening, and Yellow Bellflower, 3,000 boxes.

We sold our whole crop from 75 cents to $2.25 per box. Three-fourths of our crop packed ninety-six to the box, and the four and one-half tier will not exceed 250 boxes.

This year we thined heavier than ever before. We used arsenate of lead for the codling moth, and had only one-half of one per cent of wormy apples; had no burnt foliage, and apples hung better in the fall. Had practically no loss from dropping.

Anthracnose is a thing of the past with us. San Jose scale is the fruit growers' worst pest, but by spraying with salt sulphur and lime compound each year it can be held in check so that the per cent of loss will be small.

We have now thirty-five acres in apples, bearing, and fifteen acres two years old. We have the trees bought to plant 120 acres more this winter, which will make us 170 acres in orchard. Our planting this winter will be mostly apples—the Yellow Newtown, with a few pears and peaches.

Of the views we send you—

Plate I. Yellow Newtown tree, packed thirty-six boxes.
Plate II. A row of Newtowns.
Plate III. Pears packed for shipment.
Plate IV. Showing apples packed, Eisman Bros.

Yours truly,

EISMAN BROS.,
By F. D. E.

This letter, coming from such successful apple growers as Eisman Bros., should have a practical value to every apple grower of the State. The fact that Eisman Bros.' trees did not prematurely drop their apples before gathering time is, I am sure, for two reasons, viz.: first, arsenate of lead does not burn the foliage when spraying for the codling moth, and the tree retains its full vigor up to gathering the apples; second, the Brothers spray each fall immediately after the apples are gathered with bordeaux mixture. This spray not only controls anthracnose, but other fungi, and the tree is in the best possible condition to respond to its burden of maturing a heavy crop.

A. H. CARSON,
Commissioner Third District.

REPORT OF COMMISSIONER FOURTH DISTRICT.

THE DALLES, Oregon, March 31, 1905.

To the Honorable State Board of Horticulture:

The Lewis and Clark centennial year gives every indication of being a most prosperous one for the fruit growers of our great State.

All kinds of fruit promise abundant crops, to judge from the bloom at this time in evidence.

Cherries, peaches, apricots, nectarines, and almonds are now in full bloom and each tree resembles a huge bouquet of white and pink. So thickly set is the bloom that at a little distance from the tree the wood of the branches is entirely hidden.

Owing to the advanced season, bloom has appeared much earlier than usual this year. This condition has been the cause of much apprehension among the fruit growers who have been fearing destructive frosts. But neither frost nor cold rains have appeared so far to threaten or destroy the crop. At this date, April 7, no reports of serious damage resulting from cold weather in any section of the fourth district have been received.

That our people have confidence in the future of the fruit industry is evidenced by the many young trees being planted this season. The increase in the acreage of apples will be enormous, while many peach, cherry, apricot, almond, and prune trees are being planted.

Apricots are receiving more than usual attention this spring, due probably to the great demand and high prices obtained for this fruit last season. Conditions along the Columbia River seem very favorable for the production of this fruit, chief of which is freedom from late spring frosts, which is most essential, since their blooming season is very early, being in advance of all other varieties.

Many visitors will be attracted to our State this year by the Lewis and Clark Exposition, and our fruit growers

should all make special efforts to produce fruit of the most superior quality, to show our numerous visitors. This they can accomplish by careful cultivation, thinning and spraying of their trees. This, more than any other mode of advertising will be the means of bringing to our fertile valleys for permanent settlement a great many of the visitors that will surely be attracted to our State this year by the big fair in Portland.

THE DALLES, Oregon, December 31, 1905.

To the Honorable State Board of Horticulture:

I take pleasure in handing you herewith my annual report as Commissioner of the Fourth Horticultural District, and it is very gratifying to me to be able to report conditions most favorable.

Nineteen hundred and five was what is known among fruit growers generally as an off year. This condition was caused primarily by the very heavy crop of fruit for the year preceding, and somewhat adverse climatic conditions.

During the early part of the season unusually cold, damp weather prevailed, this was followed by the driest summer during my sixteen years residence in Oregon, which had the effect of reducing the quantity of first-grade, marketable fruit considerable. Despite all drawbacks, however, general results, from a financial point of view, are very gratifying, brought about by the prevailing high prices, and the net cash returns were almost equal to that of the preceding year, though the per cent of crop was not much in excess of 60 per cent, with the possible exception of strawberries, which yielded a full crop. Most of the fruit in this district is produced in Wasco County, which, for convenience, I will divide into three sections: The Dalles, Hood River, and Mosier. Attached are tables showing quantity produced and prices realized.

TABLE SHOWING QUANTITY AND PRICES.

Location.	Article.	Quantity.	Value.	Total.
Hood River	Apples, number boxes	60,000	$125,000 00	
	Prunes, number boxes	8,000	1,000 00	
	Pears, number boxes	5,000	5,000 00	
	Peaches, number boxes	2,000	1,000 00	
	Cherries, number boxes	2,000	3,000 00	
	Strawberries, number boxes	108,000	175,000 00	
	Small fruits, number boxes	500	1,000 00	
				$ 311,000 00
Mosier	Apples, number boxes	5,000	$ 8,000 00	
	Pears, number boxes	600	4,500 00	
	Peach plums, number boxes	3,500	1,400 00	
	Strawberries, number boxes	1,600	3,600 00	
	Prunes, number tons	225	4,500 00	
	Peaches, number pounds	12,000	480 00	
	Cherries, number pounds	40,000	2,400 00	
				$ 20,980 00
The Dalles	Apples, number boxes	10,000	$ 10,000 00	
	Apricots, number boxes	1,000	3,000 00	
	Strawberries, number boxes	5,000	7,500 00	
	Peaches, number boxes	25,000	12,500 00	
	Prunes, number tons	1,000	20,000 00	
	Plums, number tons	250	5,000 00	
	Cherries, tons	250	30,000 00	
	Grapes, tons	100	10,000 00	
	Pears, tons	200	6,000 00	
				$ 104,000 00
Total for Wasco County				$ 435,980 00
Sherman County	Apples, number boxes	1,790	$ 1,178 00	
	Prunes, number boxes	600	200 00	
	Pears, number boxes	771	620 00	
	Peaches, number boxes	8,775	2,595 00	
	Cherries, number boxes	701	496 00	
	Grapes, number boxes	1,960	884 00	
	Plums, number boxes	860	258 00	
	Blackberries, number boxes	1,115	1,680 00	
				$ 7,911 00
Gilliam Co., estimated				5,000 00
Morrow Co., estimated				5,000 00
Wheeler Co., estimated				3,000 00
Crook Co., estimated				5,000 00
Grand total for the Fourth District				$ 462,911 00

Wasco County is fast becoming one of the greatest fruit-producing communities in the State. Each year sees large additions to the already numerous orchards, but all previous tree-planting records will be far surpassed in the year 1906. Much activity is displayed by the fruit growers, and a great many new orchards are being planted.

Cherries particularly have gained wonderfully in popularity, and fully 75,000 of these trees will be planted in the district during the planting season of the fall of 1905 and spring of 1906; of this number at least 40,000 will be planted in The Dalles district. Apples are receiving their share of

attention and a conservative estimate places the number of trees that will be planted in the fourth district at 150,000, while the peach orchards will be augmented by at least 50,000 trees, besides large numbers of plums, prunes, apricots, nectarines, nut trees, and small fruits of all kinds will be planted. Nut trees, perhaps, will show the largest per cent of gain, as single individuals will plant as much as twenty acres. Another year, no doubt, it will be possible to record still greater activity in the fruit industry, as many Eastern people are coming to our shores, attracted by the wonderful productiveness of our soil, and equableness of climate.

Bugs, though they have lost some of their original terror, still continue to be the one great nightmare that disturbs the fruit grower's repose. In this department human intellect and science are waging wonderful battle against nature, and who shall say that in time skillful man will not evolve some potion which, hypodermically applied or supplied in the shape of fertilizer, will successfully destroy all injurious insect and fungi, and relegate the spray pump to the same relative position now occupied by the once indispensable stage coach?

For the time being, however, we must be content with the use of the spray pump and the remedies variously recommended for the extermination of the numerous orchard pests so well known to the fruit grower.

With the expansion of the fruit industry, a strong determination to stamp out all effects of insect and disease seems to have taken possession of the orchardist, resulting in the purchase of new high pressure pumps with which to wage successful battle.

Several reports have reached me about the inefficacy of some of the remedies recommended by this Board; upon investigation, however, it was found that slack methods had been employed in the preparation and application of the remedies, or that the ingredients had been highly adulterated.

Nothing so far discovered equals the effectiveness of sulphur, salt and lime for combating and destroying San Jose scale. If carefully prepared, whether over a fire or by the use of caustic soda, and properly and thoroughly applied, the results have been beneficial and highly satisfactory. Nothing

so far put upon the market in a "ready to use" form, for the destruction of scale, has met the requirements demanded, and it therefore continues to devolve upon the orchardist to prepare the mixture himself. The utility of this remedy greatly depends upon the strength of the sulphur, but by the use of an acid scale, the price of which is not to exceed $1, uniform strength can be secured, having as a result even and effective work.

In combating codling moth, arsenate of lead, a comparatively new remedy, was considerably used last summer by the apple growers of this district with very gratifying results. Its popularity and effectiveness has been fully established, and will doubtless be used another season to the exclusion of all other remedies.

But two counties in the district have so far appointed county inspectors, Mr. G. R. Castner, of Hood River, for Wasco, and Mr. J. T. Morris, Rufus, for Sherman County. Realizing the great importance and pressing needs of county inspectors, I shall not cease in my efforts till each of the six counties in the district will have a competent fruit grower appointed to fill this important office.

THE DALLES, Oregon, December 1, 1906.

To the Honorable State Board of Horticulture:

Great is our natural scenery; there is the famous trip down the Columbia, rivaling, if not surpassing in scenic beauty, the Hudson or the Rhine. The Cascades, with its snow-capped peaks are unrivaled.

But better than all the granduer of scenery, is our fertile soil and equable climate, so admirably adapted to fruit culture.

It would be difficult to choose a better place for engaging in the fruit business than Oregon. Its productive valleys and fertile plateaus appear by nature to have been designed for fruit culture; here all varieties adapted to the temperate zone reach their greatest perfection. As a result, fruit growing is making more rapid strides than any other industry, and at no distant date its commercial value will equal, if not surpass, that of any other product. Unequalled in quality, our fruit

Apple Picking in Oregon

commands top prices, and is in great demand in all the leading markets of the Eastern States and Europe, where an ever-increasing consumption readily absorbs all we are able to produce.

Hood River is a splendid example of what can be accomplished by systematic and thorough work, and it would be well for other sections to emulate the work of her people, who are to-day producing fruit of a quality unsurpassed anywhere, and their reward is, higher prices and better net returns with a greater demand for their product than can be shown elsewhere in the State. The several "articles" by experts in their respective lines, herewith submitted, should prove interesting and profitable reading to old fruit growers as well as beginners, and shows how, from an insignificant beginning not many years ago, the people of Hood River, by thrift and constant application, have made their product famous the world over. They are an energetic and unselfish class, being ready to impart to others the knowledge by which they gained their prominence.

In a very able and most comprehensive paper, Prof. C. D. Thompson describes the strawberry industry from its very incipiency to its present splendid magnitude. Mr. G. R. Castner, county fruit inspector for Wasco County, tells in his paper how they raise the magnificent specimen of Spitzenberg and Yellow Newtown Pippin that have made Hood River famous. Mr. G. D. Woodworth, who is authority on the subject, fully describes how an extensive cherry orchard is conducted in Hood River, and his article should be carefully read by those who contemplate going into the cherry business for commercial purposes.

What has been accomplished so successfully by Hood River people can be done elsewhere with perseverance and systematic work. All soils are not adapted to apple culture, but this need not be a deterrent, as cherries, peaches, apricots, pears, grapes, and other small fruits can be grown very profitably on the right kind of soil.

The Dalles growers are displaying greater energy than ever before, and much planting of young orchards is in evidence. Cherries, however, seem to be much in the lead, and large

orchards of this valuable fruit will be set out during the ensuing planting season; 35,000 trees appears at this time a conservative figure of the number that will be planted, though this may be exceeded by several thousand if nurseries can supply the stock.

With the already large acreage in cherries in the vicinity, her claim to the title of the "Cherry City" does not appear to be misplaced.

Large plantings of peaches, apricots, pears and grapes will also be made, and many of the old and neglected orchards are being renovated and brought into a state of productiveness.

The Mosier community has passed through a prosperous season, and shows record of a bumper crop, and a rapidly increasing acreage in orchards; many thousands of trees are being planted, consisting mostly of apples and cherries.

Spraying is, at the present time, one of the principal requisites to fruit culture, a fact of which every fruit grower is fully aware, and that regular and systematic spraying is practiced is demonstrated by the largely increased quantity of clean fruit being put upon the markets.

The San Jose scale has become so generally distributed in all fruit-growing sections that most growers have become acquainted with its destructive effects. It attacks all kinds of fruit trees, and may be found in many instances on native trees, especially on willows along creek bottoms adjacent to orchards; even pine trees are infested with this most insatiable of all insects. When present on bearing trees, it always attacks the fruit, causing conspicuous red blotches. It has lost many of its former terrors, however, as it is not difficult to control, and even eradicate this pest from the orchard entirely by using the sulphur and lime spray, properly prepared and thoroughly applied during the dormant season.

Arsenate of lead has become recognized as the leading remedy for combatting codling moth. Several well-known brands of equal effectiveness are now upon the market. The first spraying for this insect should be applied after the blossoms have fallen, and before the calyx cups have closed. This first spraying is by far the most important, and should be applied with much force and without stint of material, using a coarse spray until the trees and fruit are thoroughly drenched. The

second spraying should be given two weeks after the first, in a fine mist, with as much pressure behind the pump as possible; subsequent sprayings should be applied at intervals of from three to four weeks during the season.

Peach Worm.—This insect seems to have invaded Oregon orchards to some extent, and according to Bulletin No. 144, by Prof. Warren T. Clarke, of the California Experiment Station, can best be kept in check by spraying with sulphur, lime and salt, applied early in the spring, as indicated by extensive experiments conducted on a large scale in a number of California orchards, and is recommended to Oregon growers.

That the fruit industry is in a healthy and growing condition will be seen by the increased quantity of fruit produced in the fourth district.

All varieties show a decided increase over the previous year, with the exception of cherries and strawberries; these were materially injured during the March freeze up. Tables attached will show product of the different fruit sections in the district.

Location.	*Article.*	*Quantity.*	*Value.*	*Total.*
Hood River	Apples, number boxes	230,000	$345,000 00	
	Pears, number boxes	6,000	6,000 00	
	Prunes, number boxes	6,000	3,500 00	
	Peaches, number boxes	2,500	1,250 00	
	Cherries, number boxes	1,500	1,750 00	
	Strawberries, number boxes	50,000	125,000 00	
	Blackberries, number boxes	2,000	4,000 00	
				$ 486,500 00
Mosier	Apples, number boxes	20,000	$ 28,000 00	
	Pears, number boxes	1,000	1,000 00	
	Plums, number boxes	4,000	2,000 00	
	Strawberries, number boxes	1,000	2,500 00	
	Prunes, number boxes	15,000	6,000 00	
	Peaches, number boxes	3,000	1,500 00	
	Cherries, number boxes	2,500	3,125 00	
				$ 34,125 00
The Dalles	Apples, number boxes	15,000	$ 15,600 00	
	Apricots, number boxes	5,000	3,750 00	
	Strawberries, number boxes	3,000	6,500 00	
	Peaches, number boxes	40,000	20,000 00	
	Prunes, number tons	1,200	24,000 00	
	Plums, number tons	300	6,000 00	
	Cherries, number tons	150	21,000 00	
	Grapes, number tons	120	12,000 00	
	Pears, number tons	225	6,750 00	
	Small fruits, number crates	2,000	4,000 00	
				$ 119,600 00
Sherman County, estimated				8,835 00
Gilliam County, estimated				7,500 00
Morrow County, estimated				7,500 00
Wheeler County, estimated				5,000 00
Crook County, estimated				5,000 00
Grand total				$ 666,560 00

This shows an increase of $203,649 over 1905 in the value of the fruit crop of the fourth district. This increase is attributable to several causes, but mainly to the largely increased number of young trees coming into bearing, and the fancy prices realized for all kinds of fruit. Prices on apples, peaches, and cherries having ruled exceptionally high.

R. H. WEBER,
Commissioner Fourth District.

REPORT OF COMMISSIONER FIFTH DISTRICT.

Cove, Oregon, April 7, 1905.

To the President and Members of the State Board of Horticulture:

The winter in the fifth district has been rather a peculiar one. We had mild, balmy weather up to the 10th of February, when it turned suddenly cold and the mercury dropped as low as 14 degrees below zero in some parts of this district, and while one would suppose that the fruit would all be killed, such was not the case. I do not believe the crop is materially affected with the exception of peaches, and they only in the localities where it got so extremely cold. While cherries are more or less damaged, yet the crop will be a good one. It is rather peculiar that there will be two cherry orchards within half a mile of each other, at the same altitude, and other conditions apparently the same, one will be injured by the freeze and the other a full crop.

Prunes appear to have come through with but slight damage, and the same can be said of pears. The apple crop will undoubtedly be large.

While growers did not realize as good prices last season as they had expected, there has been no abatement in the setting of new orchards, and I believe there was more new orchards planted in the fifth district this spring than ever before.

Weather conditions at this time are very favorable—moderately warm with plenty of moisture. The season is from two to three weeks earlier than usual, but there is no great reason for fear now from spring frosts.

Portland, Oregon, October 11, 1905.

To the President and Members of the State Board of Horticulture:

I submit my quarterly report for the year ending September 30. My work has been confined to Umatilla, Union, and Baker counties.

The fruit crop in my district for the present season is a very light one. Not one variety has yielded a full crop. In some localities that were favored the growers have done exceptionally well, as prices have been good and sales brisk. It is one of the driest seasons I have ever known. Orchards not thoroughly cultivated or not irrigated have suffered in consequence. In well-cared-for orchards I have found the apples of a very fine quality and the prospect now seems good that prices will rule high. Picking has not begun and it is difficult to estimate the crop.

Cherries were about one-third of a crop. The quality was good and the returns in the main were satisfactory to the grower.

The pear crop was a good one, but just as the bulk of our crop was ready for market, the condition of the Eastern market became so demoralized that much of it had to be worked off in near markets at a very small profit.

The peach crop was light, except in favored places. The growers there found a ready home market at good prices.

The prune crop is probably one-third of a crop. The fruit large and of fine quality. The picking is now in progress. The fruit will nearly all go to the driers.

Fruit inspectors have been appointed for Union and Umatilla counties, and in a short time Baker County will also have one. In all the principal markets of my district we shall then be able to keep out diseased fruit.

1905 FRUIT ESTIMATE.

	Amount.	*Value.*
Apples, number cars	150	$ 90,000 00
Prunes, number cars	40	16,000 00
Pears, number cars	10	8,000 00
Peaches, number cars	5	4,000 00
Cherries, number cars	8	15,000 00
Grapes, number cars	5	5,000 00
Strawberries, number cars	20	15,000 00
Small fruits		5,000 00
Total		$ 158,000 00

COVE, Oregon, April 8, 1906.

To the President and Members of the State Board of Horticulture:

The main question with the fruit growers of the fifth district is the amount of damage done the crop by the freak weather of March. I believe pears have been damaged more generally over the district than any other fruit, while peaches come next. Cherries in some parts are only slightly injured. The prune crop bids fair to be large, and the same can be said of apples.

There is a great deal more interest shown this spring than ever before in spraying, and taking care of the orchards, and the pests will be fought this year as they never have before.

There will be county fruit inspectors in the four leading fruit counties in the district. They are: Howard Evans, of Freewater, Umatilla County; P. H. Dickison, of La Grande, Union County; A. J. Hilton, of New Bridge, Baker County, and E. B. Conklin, of Ontario, Malheur County. They have instructions to condemn any and all diseased fruit offered for sale, or, in other words, to enforce the law strictly as it reads.

The high price of apples during the past season has stimulated many growers to set out more orchards. A greater interest is being shown in the fruit industry from a commercial standpoint than ever before.

PORTLAND, Oregon, October 5, 1906.

To the President and Members of the State Board of Horticulture:

I respectfully submit to you herewith a brief report of the work done in the fifth district during the biennial term ending September 30, 1906.

My district comprises the counties of Union, Wallowa, Baker, Grant, Malheur, and Harney. The counties named contain so much territory that it is impossible to give my personal attention to such portions as contain only scattered orchards. I have greatly felt the need of county inspectors

for that reason, and fully appreciate the help they have given me in my work during the past year. In only four counties of my district, Umatilla, Union, Baker, and Malheur, did I feel that the fruit interests of the county were great enough to demand the services of a county inspector, and would justify the expense. With the aid of deputies in my work, I have been enabled to more rigidly enforce the law in regard to the sale of affected fruits in the markets. It seems the only method of raising the standard of our fruits, and protecting the interests of the grower.

The family orchard must ever be a matter of taste or preference on the part of the grower, a majority of them containing as large a variety of kinds as the space will permit. The owners do not expect to derive any profit therefrom, hence it is hardly in order to offer any suggestions in regard to varieties to this class of growers. The commercial grower views the question in a different light. He will do well to study most carefully every phase of the question, from the very best sources obtainable, before he ventures to make a final decision. Of course the first point to be decided, is location. I know of no better way to decide than to personally visit orchards in the vicinity in which you contemplate choosing your ground. Ascertain what varieties attain perfection in the given location, and be sure these are such as have an established reputation for real commercial value. Find out what market you can depend upon and what your means of transportation must be, and if help will be easily obtainable during the picking and packing season. Above all, examine carefully the soil, conditions vary so in a mountainous region. Some of the choicest land for fruit purposes may lie very near to that which is entirely worthless from a commercial standpoint. If you have found the right location, the first cost of the land is of minor importance, by all means get it at a low price if possible, but get it. It is poor economy to battle with adverse conditions for years, perhaps for life, in order to utilize cheap lands for fruit growing. Better by far buy a smaller tract where conditions are favorable to your success.

Gravenstein Apple Tree, Orchard of J. L. Carter, Hood River, Oregon

Apple Picking, Orchard of W. K. Newell, Gaston, Oregon

Of all the fruits, of all climes, the apple, to me, holds the greatest attractions for the commercial grower. There is such a wide range of varieties, many of them of such good keeping qualities as to cover practically the markets for the entire year. They are used in so many ways that they are regarded as a staple article of diet by a large class of people. By all means grow standard fruit, whose names are well known in the big markets. While there are some very choice new varieties, they are doubtful money-makers. On every side do we hear the praises of the Yellow Newtown and Spitzenberg and if you are sure they are suited to your location, by all means accept them, as they stand at the top, but there are locations in my district where they are not profitable, when such varieties as Jonathan, King, Rome Beauty, Gravenstein, and some others yield splendid returns to the grower. The last-named varieties will have size, color, aroma, and above all firmness, which gives them shipping value. This enables the grower to choose his market from the wide world if he so desires. It is no uncommon thing to read of a grower selling his crop to be shipped to Russia, Japan, or Alaska.

If the growers of your locality can unite on a specialty and be prepared to supply it in large quantities, I know of no surer way to become known and recognized in the fruit world. It will attract buyers and result in better prices and increased profits. It is of itself an advertisement. It has been done in several locations of California and Oregon, and can be done in many others by united effort. Do not take the same specialty which some other locality has chosen, but have one of your own. The field is really a broad one. There are many places in my district where the cherry grows to great perfection, surpassed by none that I have ever seen on exhibition from any place. There is at present much enthusiasm among orchardists over cherry growing and the demand for trees far exceeds the supply. While there are many reasons why I do not consider them a stand-by for every-year profit like the apple is, where they do well they are certainly an easy second. The life of the tree is not as long, neither is the crop so sure, but when crop and prices are right they are a

bonanza to the owner. The conditions are most favorable to the cherry in Eastern Oregon. The crop is matured before the dry season has advanced to any extent, hence if well cultivated it can always be grown without irrigation. The crop being gathered at the beginning of the dry weather proves an advantage in another respect. I have never known a crop injured by cracking, due to continued damp weather, which the growers in many localities have to contend with. The trees are never broken down by a heavy crop, and there is no thinning of fruit to be done. The leading varieties of cherries for commerce are the Bing, Royal Ann and Lambert. The Black Republican is an old stand-by and there is money in growing it for market, but there are so many larger varieties that there is little demand for the trees.

The season of 1906 has proved a light year on nearly every variety of fruit. Apples are about one-half a crop, and owing to the law against selling wormy apples being enforced more stringently than ever before, it will reduce it from that somewhat. They are of fine quality and size, so the culls will not be so many.

Prunes in Umatilla County were a full crop, and about seventy-five carloads were shipped fresh to Eastern markets. The balance being dried at the local driers. The prunes of Union County are a good crop, but have a tendency to wither at the stems. They will be handled by the dryers.

Cherries were about one-half a crop, and prices ruled good. The crop was mainly sold for canning of the Royal Anns. About one-half of the cherries were shipped fresh to Eastern market. They were largely Bings and Lamberts.

Peaches have brought high prices during the entire season. The best stock bringing $1 and $1.25 per box. High prices have in a measure made up for the shortage in yield.

The price of pears was good, but yield light. The home demand consumed practically the entire crop.

During the entire berry season the market was good. It was difficult to secure help. In some places large quantities of raspberries wasted because pickers could not be had. We have come to regard it as the rule during the strawberry season for prices to remain high.

Malheur County grows large quantities of melons and tomatoes on irrigated land. It is an ideal place for growing them. They are shipped in considerable quantities. That portion of my district is attracting much attention and appears to be making rapid strides.

Irrigation is bound to play an important part in the history of fruit growing in Eastern Oregon. Some argue that irrigation produces fruit of poor flavor. I find that it is the manner in which the water is applied which affects the quality of the fruit. If used in moderation and followed by thorough cultivation, the fruit will be developed naturally and it will prove a great aid. No orchardist should be without a reserve of water if it can be obtained at almost any price. It will doubtless save many times its cost.

As nearly as I can obtain statistics with my present facilities, I am enabled to make the following estimate of the values of fruit grown in my district:

	1905.	1906.
Apples	$140,000 00	$ 125,000 00
Cherries	40,000 00	30,000 00
Peaches	25,000 00	20,000 00
Pears	20,000 00	15,000 00
Prunes	30,000 00	40,000 00
Strawberries	35,000 00	30,000 00
Other fruits	15,000 00	20,000 00
Melons and tomatoes	20,000 00	25,000 00
Totals	$325,000 00	$ 330,000 00

JUDD GEER,
Commissioner of Fifth District.

REPORT OF COUNTY INSPECTORS.

UMATILLA COUNTY.

MILTON, Oregon, November 1, 1906.

To the Honorable State Board of Horticulture:

I beg to submit herewith my report as county fruit inspector for Umatilla County.

The output of fruit for this county has been considerably below the average this year, owing to the cold snap in March, when a good many of the fruit trees were in bloom. This cold weather proved very disastrous to many varieties. Apricots, cherries, pears, and peaches were the varieties that suffered most, many orchards having only about one-tenth of a crop; but in general, the good prices partially compensated for the reduced quantity.

The following table shows the horticultural conditions of Umatilla County during the year 1906:

	Trees bearing.	*Non-bearing.*	*Totals.*
Apples	65,559	3,227	68,826
Apricots	332	85	417
Cherries	10,452	1,502	11,954
Peaches	31,020	12,122	43,142
Pears	8,218	91	8,309
Prunes and plums	28,307	4,065	32,372
Totals	143,928	21,092	165,020

Grapes, thirty-six acres; strawberries, 234 acres; blackberries, eighty acres; raspberries, fifteen acres; dueberries, five acres.

Total number of acres in large and small fruits, 1,950 acres.

I have visited and inspected 800 orchards in the county.

A large per cent of fruit is hauled by train to Walla Walla, Washington, and enters the markets of the Northwest as Washington fruits.

The amount of nursery stock handled at this station annually ranges from 400,000 to 500,000 plants, both fruit and

ornamental, nine-tenths of which is produced by A. Miller & Sons, who have been in the nursery business since the year 1878.

I found when I entered the field as fruit inspector of this county that I had a big responsibility upon me, and one that would require the co-operation of the growers and shippers to get the best results, which I am glad to say I have had with very few exceptions; and those who opposed spraying in the spring tell me that they are going to spray more thoroughly in the coming seasons than ever before, and that they will insist that the law be enforced more rigidly than ever before, both as to spraying and the sale of infected fruit.

Quite a number of the orchardists used arsenate of lead, two and one-half to three pounds to fifty gallons of water, for codling moth, with the best results ever shown in the county.

I notice that it pays to prune, cultivate, then spray and pack your fruit well, and I am sure you will grow good marketable fruit, and drive the insects from your own orchards to that of your neighbor who does not spray.

Now, in regard to the San Jose scale in this county, it is more prevalent this season than in the past. We all sprayed with the lime-sulphur spray as given in the Bulletin No. 4. It may be owing to discontinuing the use of salt, or a poor quality of lime and sulphur. I would suggest that the State Board of Horticulture recommend some brand of spraying material that will stand the test, and be labeled as to its purity as the law prescribes, as it seems unfair to deprive a grower selling his products, who has complied with the inspection law, and finds too late the spraying material adulterated.

This last season has brought the need of a system of preserving fruit, and probably a vinegar factory, very forcibly to the minds of the thinking people of the county, as the operation of our inspection laws leaves many tons of fruit that now go to waste, which might and should be made to bring returns to the producer.

However, this amount will be reduced to a large extent with the better handling of the orchards in the future, but there

must always remain many tons of products that should be made to add to the wealth of the county. Should such a market be at hand for second-grade fruits, the tendency to raise the grade of "firsts" would be materially raised, adding to its market value, and the reputation of the county as a fruit-growing section.

The orchards of this county have gone into winter in a most promising shape as to vigor and full setting of fruit buds. All kinds of fruit trees show an over-abundance of fruit buds. Umatilla County should and would out-rank any county in the State if the growers would take more time spraying and thinning. The prices of fruit is not up to what it should be, or would be, if more carefully assorted and better packed.

Some one has said the vocation of fruit growing requires constant care and attention in every detail, very close observation and enthusiastic love for the work, coupled with a determination to succeed, let the obstacles be what they may. "I will, I shall," backed by good judgment, can never know defeat.

HOWARD EVANS,
Fruit Inspector for Umatilla County.

SHERMAN COUNTY.

Report of fruit raised in Sherman County, Oregon, in 1906:

Peaches, 8,000 boxes, 50 cents per box	$4,000.00
Blackberries, 840 creates, $2 per crate	1,680.00
Pears, 800 boxes, 75 cents per box	600.00
Apples, 1,000 sacks, $1 per sack	1,000.00
Cherries, 500 boxes, 75 cents per box	375.00
Apricots, 100 boxes, 80 cents per box	80.00
Grapes, 1,700 boxes, 50 cents per box	850.00
Plums and prunes, very light crop this year, about 500 boxes, 50 cents per box	250.00
Total	$8,835.00

The fruit trees are in good condition.

There is a number of acres of land along the John Day River that would produce good fruit, but I do not know of any trees to be set out this fall.

J. T. MORRIS,
Fruit Inspector of Sherman County.

GILLIAM COUNTY.

Olex, Oregon, September 28, 1906.

R. H. Weber, Commissioner Fourth District of State Board of Horticulture:

I have made as careful and thorough examination of the fruit conditions in Gilliam County as time and health would permit. As a rule I find the orchards in rather poor condition for want of spraying. The scale is materially injuring the trees, and the codling moth and scale are found in most all orchards. On the uplands trees are dying and it is my opinion that fruit cannot be successfully raised on the uplands under present conditions. On the lowlands, and especially where trees are irrigated, they make a good growth and with our climate fruit raising could be made a success if men would use the necessary means to destroy the scale and moths which infest the trees and fruit.

A few persons who have orchards are using more or less means to preserve their trees and fruits and are being well rewarded for their labor and expense, as they have good fruit and fruit is in demand at good prices. My judgment of the percentage of the fruit crop of Gilliam County this year is: Apples and peaches, 50 per cent; pears and prunes, average; apricots and cherries, failure. I think the acreage in fruit is on the decline and few persons are planting trees in this county. The soil, climate, and conditions are favorable, and as good fruit can be raised on the river and creek bottoms as can be raised anywhere, but few people care to give the time and attention to it that is necessary to make it a success.

T. C. Mobley,

Fruit Inspector for Gilliam County.

SOME APPLE TREE PESTS.

By A. B. CORDLEY.

It was my intention when asked to prepare an article on fruit pests for this report to make the account as complete as possible with the data available, but only a brief outline of the proposed report was necessary to show that neither the time to prepare it, nor the space for its publication, was available at this time. I have therefore concluded to restrict myself to a comparatively small but, perhaps, the most important part of the subject, viz.: the four principal pests of the apple. I have the more readily come to this conclusion by reason of the greatly increased interest in apple growing in the various parts of the State, and by the fact that during the past few years I have published bulletins or reports upon these pests, the editions of all of which have been completely exhausted, indicating an active interest in the subject.

Many pests attack the apple—insect pests, fungus diseases, bacterial diseases, etc.—but in this State at present there are but four which stand out from all the others as of first importance. These are the codling moth, the San Jose scale, apple tree anthracnose, and apple scab.

One fungus, apple tree anthracnose, and one insect, the San Jose scale, are destructive to the tree itself; while the other insect, the codling moth, and the fungus, apple scab, to a greater or less extent ruin the crop.

THE CODLING MOTH.

It is undoubtedly true that there are small apple growing sections scattered here and there throughout the entire Pacific Northwest that are still free, or practically free, from the codling moth. But does this necessarily imply that they are to remain free? Does it necessarily imply that the climatic or other natural conditions are such that the moth can not thrive there? May not the present immunity be ac-

Mosier, a Fruit-Growing District Between The Dalles and Hood River, Oregon

counted for on other grounds? During the past six years it has been my privilege to visit several of these favored sections and to note the conditions, both by observation and by conversation with resident fruit growers. Six or seven years ago Hood River, probably the most famous apple growing region in the State, was said to be practically free from this pest. Its presence in small numbers was admitted, but little damage had been done and little fear was felt for the future. The cold evening breezes that come down from the mountains were said to prevent the moths from depositing their eggs. To-day the mist from the spray pumps as it floats over the orchards of that region demonstrates alike the progressive nature of the fruit growers and the error of their former belief.

There are still scattered here and there throughout the eastern part of our State, communities that indulge in this same hope of immunity from the codling moth and for the same reason. It is seriously to be doubted whether their expectations have a firmer foundation of facts than existed at Hood River.

West of the Coast Range of mountains there are other communities which also indulge in this same hope of immunity, but for other reasons. There it is not the cold breezes which come down from the mountains—the breezes do not come that way—but the moisture, the temperature, the "salt" or some other unknown feature of the ocean winds which kiss the orchards of those regions, that is supposed to carry death and destruction to the codling moth and joy to the hearts of the apple growers.

During the last few days of August and the first of September, 1899, I took a hurried trip through portions of Coos County, Oregon, for the special purpose of demonstrating, to my own satisfaction, the presence or absence of the codling moth, and in case of its absence to investigate so far as the time at my command permitted, the conditions under which this immunity existed.

As a result of this trip I became convinced that at that time (1900) the codling moth was not present, to any great extent at least, in the Coos Bay region. I also became con-

vinced that the present immunity can be accounted for on the ground of isolation rather than that of peculiar climatic conditions, and that it is not likely to be permanent. Coos County is a beautiful region, broken, mountainous and timbered. Its only connection with the outside world is by boat, or by wagon roads over the mountains from Drain or Roseburg. The codling moth must of necessity be introduced by one or more of these routes. As shown above, the absence of orchards in the immediate vicinity of Empire and Marshfield, render it unlikely that the moth could obtain a foothold even though repeatedly introduced at these points in imported fruit. From Drain it has advanced from orchard to orchard nearly to tidewater at Scottsburg, where it has been checked by the absence of other orchards to conquer. From Roseburg it has spread along the Roseburg-Myrtle Point route over the mountains to within ten or twelve miles of the latter place, and is reported in several orchards about there. It is also reported in several orchards about the head waters of the Coos River, having probably advanced from orchard to orchard along the wagon road from Roseburg to Coos Bay as it has along the Roseburg-Myrtle Point route.

It seems evident that the reason for the present immunity from codling moth ravages in the orchard of the Coos Bay region is not far to seek. On account of its geological conformation, the highways leading to this region mostly follow the windings of the streams in and out of the timber-covered mountains. The orchards, mostly home orchards, are located here and there along the highways in little valleys or pockets between the mountains, often at considerable distances apart. Each orchard, or little group of orchards, is therefore protected by a natural barrier of timber and mountains, practically insurmountable to the codling moth unless it be carried over or around it by human agencies.

I believe the idea that climatic conditions are responsible for the absence of codling moth injury has been decidedly harmful. It has carried with it the idea that no effort is necessary to keep the orchards free from this, the greatest apple pest. I believe that by a rigid system of orchard inspection put in operation a few years ago along the highways

leading from Roseburg to Myrtle Point and Coos Bay, and a rigid quarantine of infested fruit, that it would have been possible to exclude the codling moth from this entire region for years to come. It is probably too late now. Still there are undoubtedly many isolated orchards in which it is not yet found and which can be kept free from its ravages for years by a little effort. The utmost care should be taken to prevent its introduction into such orchards either in infested fruit or in the packages in which such fruit has been packed.

So far as the codling moth is concerned, the Yaquina Bay region is essentially the same as the Coos Bay region. The codling moth has as yet caused no serious injury there; and the impression is quite generally held that conditions are such that it will not thrive. That it is present, however, is shown by the presence of wormy apples in the horticultural exhibit at the county fair held at Toledo in the fall of 1901. There, as elsewhere in the State, where the pest has not as yet gained a firm foothold, it would seem far better for the fruit growers themselves to establish a strict orchard inspection and fruit quarantine in the attempt to check its spread rather than to rely on the vain hope that ocean breezes will compass its destruction. Other localities have been buoyed up with the same hope only to have it shattered with the passing of the years. In the *Oregon Agriculturist and Rural Northwest*, January 15, 1899, occurs the following quotation from the *Pajoronian*, of Watsonville, California: "The codling moth has not been kept out, for any great length of time, of any of the districts where apples are produced for general sale. Every new apple district is 'without the codling moth territory.' We have talked that way about the Pajaro Valley; but the codling moth has not been kept away because of fogs or the fact that this district is within ten miles of the coast. * * * It will not be kept down by fogs and ten-miles-from-the-coast belts, alone. Active and intelligent work is necessary to check the ravages of this great apple pest, the most serious foe of Pajaro Valley's greatest crop."

The mere fact that the codling moth is a serious pest in England, on the continent of Europe from Mediterranian regions to the northern limits of apple growing in Siberia, in

Southern Africa, Australia, New Zealand, Tasmania, China, and most of the fruit-growing regions of the United States and Canada, would indicate that the slight variation in climatic conditions which occurs between localities in this State in which the codling moth is a serious pest and those localities only a few miles distant in which it is yet scarce or absent is not enough to account for its absence or scarcity.

NOT MORE DESTRUCTIVE HERE THAN ELSEWHERE.

While I cannot, therefore, concur in the optimistic belief that any of the sections of the State devoted to apple growing are to remain permanently free from codling moth injury, neither can I agree with the pessimistic statement sometimes heard that such injury is much more serious here than elsewhere. Even approximately accurate estimates of the losses caused by any insect are difficult to make. In 1897, Mr. H. B. Miller, ex-president of the State Board of Horticulture, stated that a very moderate estimate of the loss in that year from scale, moth, and scab was one hundred and fifty thousand dollars. An editorial in the *Oregon Agriculturist and Rural Northwest,* December 15, 1898, states that "The codling moth is about as interesting an insect to the freight managers of Oregon railways as to the fruit growers themselves. If it had not been for the ravages of that insect it is probable that the shipments of apples from the State this season would have been increased by at least a thousand carloads."

Simpson states that 50 per cent of the apple crop of Idaho was destroyed by the codling moth in 1900, the injury ranging from 5 per cent in some well cared for orchards to 100 per cent in small orchards and isolated trees.

I have myself repeatedly observed individual trees, both in Oregon and Washington, on which it was practically impossible to find a wormless apple, although the trees were loaded with fruit. I have not noticed, however, that the average annual loss is relatively greater here than in Michigan. I believe it is not.

Eighty years ago Kollar wrote that in Germany more than half, particularly of the choice fruit, was eaten into by the apple worm, and Stainton, a celebrated English entomologist,

stated that in 1868, in the vicinity of London, it was scarcely possible to find a single fruit uninfested by the codling moth, although there was an abundant apple crop. Recent reports seem to indicate that the injury is still as great in some parts of Europe as in America. During the past half century the losses in this country from the ravages of this pest have been enormous. Hardly a horticultural report from any apple growing region is to be found that does not mention its destructive work. In 1887, Forbes made careful observations that led to the conclusion that the annual loss in Illinois from the codling moth is not less than $2,375,000—one-half the value of the average apple crop of the State. In 1892, the loss in Nebraska is said to have reached at least $2,000,000. Slingerland estimates that in New York, with many growers employing modern methods of fighting the insect, the average loss is fully one-third of the total crop—a loss of $2,500,000 worth of apples and $500,000 worth of pears. He also states that "conservative estimates put the annual loss from its ravages, in all countries where it is noticeably destructive, and but little is done to check it, at from 25 to 75 per cent of the crop of apples, but with pears the loss is considerably less."

I do not intend to argue that the codling moth will become equally destructive in all localities, or that the degree of its destructiveness is entirely independent of climatic conditions. It is known that the seriousness of its depredations varies both with the locality and the season. It is admitted that "temperature is the great factor which controls the geographical distribution of life, and temperature is at the back of all those apparent living first causes which control the abundance of a species in a given region, provided we trace them far enough." I do wish to suggest, however, that in the case of an insect that has exhibited such a wide range of adaptability to varied climatic conditions as has the codling moth, that it is not likely that anywhere within the limits of this State are these conditions to be relied upon to prevent its development in injurious numbers.

I believe that neither actual nor prospective fruit growers should allow themselves to be in the least discouraged by re-

ports of the unusual destructiveness of this insect in the Pacific Northwest. Its ravages are serious to be sure, but so they are in other apple-growing centers. No doubt there are localities in which the codling moth has been present but a comparatively short time, where the injury has been excessive during one or perhaps several years. The balance of nature has not been struck. The various enemies of the moth are not yet doing their share in reducing its numbers. Such conditions have occurred and do still occur elsewhere, seasons of excessive loss alternating with seasons of comparatively little injury. I believe a candid examination of the facts should give hope for the future.

DESCRIPTION AND LIFE HISTORY.

When fully grown in fall, each larva usually leaves the fruit in which it developed, seeks some secluded spot and spins about itself a silken cocoon in which it passes the winter. Late in March, some of these larvae transform to pupae from which the moths emerge about the first of April, and from this date moths are continually emerging until the first part of July.

The moths are really beautiful little creatures. The abdomen and the hind wings, which are covered when the insect is at rest, are of a modest greyish brown color. The ground color of the fore wings is similar, but is relieved by transverse, wavy, alternating bands of grey and brown. Perhaps the most characteristic marking is a large golden-bronze spot at the inner hind angle of each front wing. I know of no other common insect with this mark, and no insect in which it is absent need be mistaken for the codling moth.

The males are further distinguished by a narrow pencil of black hairs on the upper surface of the hind wing and an elongated blackish spot on the under surface of each front wing. Owing to its peculiar coloring, which harmonizes well with the color of the bark, and the habit of usually remaining quiet during the daytime, it is rare indeed to find a fruit grower who is acquainted with this beautiful but destructive little insect. Indeed, I find that commonly the most widely divergent ideas are held as to its appearance, and unscrupu-

lous persons rely upon this wide-spread ignorance to advertise and sell "trap lanterns" and other worthless devices for capturing the moths. Only a slight knowledge of the appearance of the moth is needed to convince even the most credulous that the masses of insects caught by such means rarely contain a codling moth. Such a knowledge can readily be obtained by picking some wormy apples in July or August and placing them in some closed receptacle. In the course of a few weeks the moths will emerge. When once familiar with their appearance one may detect them flitting about the trees at dark depositing their eggs upon the fruit, and more rarely upon the foliage, and may occasionally observe them during the daytime resting quietly upon the leaves or bark. I have also rarely found them resting upon the ground.

It is usually stated that the moths appear in spring about the time the apple trees are in bloom. Slingerland sums up his own observations, as well as those previously published by other observers, with the statement that "what little definite evidence there is upon this point indicates that the majority of the moths do not emerge until several days after the petals have fallen."

At Corvallis there seems to be no relation whatever between the time at which the apple trees are in bloom and the dates on which moths emerge. In 1896, apple trees were in full bloom April 20, and most of the petals had fallen by May 1. Only a few moths were reared that season, but some of these emerged as late as the middle of June. In 1898, the trees were beginning to blossom April 10, and the blossoms had mostly fallen by April 28. In a storeroom moths began to appear as early as April 10, and on June 16 two perfectly fresh specimens were captured in the orchard. In 1899, moths began to appear in breeding cages April 10, and continued to emerge to July 1. April 21, the earliest apple trees were just coming into blossom and the petals were not all off before May 10. Although the apple trees were in blossom nearly two weeks later in 1899 than in 1898, the moths began to appear at practically the same time (April 10-11) and continued to emerge for nearly or quite two months after the blossoms had fallen.

A still more remarkable variation from the usual habits of the insect as recorded from other localities, exists in the times at which the moths deposit their eggs. The idea held until recently was that the eggs are laid in the calyx or blossom end of the fruit soon after the blossoms fall. This idea was first shown to be erroneous by the observations of Koebele in 1888. In September he found only about one pear in twenty without eggs or young larvae of the codling moth. "As many as eleven eggs were found upon a single pear. One was found on the stem, six on the pear surrounding the stem, two on the upper half and the other two near the calyx." Since then the fact that the eggs are not laid in the calyx but upon the exposed surface of the fruit, has been verified by Washburn, Slingerland, Card, and others, and Card has also called attention to the fact that they are sometimes exposed upon the leaves.

In New York, Slingerland found eggs upon the fruit the last week in May (1896-97), a week or more after the blossoms had fallen. Gillette states that in Iowa, in 1889, no larvae had hatched until nearly a month after the blossoms were off. Allowing for an existence of a week or ten days for the egg stage would bring the date of oviposition from two or three weeks after the petals fell. In 1887, Card observed that while the petals were mostly off by May 10, the first eggs were not found until about three weeks later.

At Corvallis egg laying is delayed until a much later date. April 10, 11 and 12, 1898, moths were placed in breeding cages with fresh blossoms for the purpose of obtaining eggs. None were obtained, however, and neither eggs nor larvae were seen upon the fruit out of doors until July 1, when a single recently hatched larva was found just beneath the skin of a Waxen apple. July 4, three more were found, and on July 7, ninety-seven of the 475 apples on the tree were found to contain young larvae. Allowing a maximum of ten days for the egg state brings the date at which the very first eggs were deposited at June 21, while the egg laying evidently did not become general until about June 28. As shown above the petals had fallen by April 28, about two months before. In 1899, however, moths were placed in breeding

Bartlett Pear Orchard of Mr. Plog, Hood River, Oregon

Orchard of Geo. Conn, at Paisley, in Southeastern Oregon

cages with fresh blossoms on April 21, 22, 25, 29, May 4, 5, 8, 9; and on May 11 ten eggs were deposited. At this time the petals had been off the trees scarcely more than two weeks. However, no eggs or larvae were obtained on fruit on the trees until June 28, when numerous eggs and very young larvae were found on Ben Davis apples. In 1900 the blossoms were mostly off by May 1. The first egg was seen June 11, another June 14, and the first larvae June 26. It appears from the above observations that while the blossoms fell at various dates from April 28 to May 10, egg laying rarely begins before the middle of June, and is not general, much if any, before June 25. This does not hold true for the dryer and warmer parts of the State, nor is it necessarily true for the entire Willamette Valley. In Southern Oregon and parts of Eastern Oregon, egg laying certainly begins in May, and reports from various parts of the Willamette Valley indicate that the date at which the first larvae begin to work in fruit at Corvallis is unusually late even for this section.

THE EGG.

The eggs of the codling moth are minute scale-like objects about one-twentieth of an inch in diameter. They may be likened to a very small trout scale glued to the surface of the leaf or fruit. Being so small and at the same time transparent, or with only a slight yellowish tinge, they can be detected only with difficulty by those unfamiliar with their appearance. When once familiar with them, however, and every apple grower should become familiar with them, one can readily find them in this vicinity at any time from late in June until at least October 1, and probably later. So far as my observations go, they are found much more commonly upon the fruit than upon the leaves, although undoubtedly when fruit is scarce they may be more abundant upon the leaves.

The duration of the egg stage probably depends somewhat upon temperature. According to recorded observations, it may range from four to ten days. A large number of eggs were deposited in one of my breeding cages, September 5, 1898. September 10, the developing larvae could be plainly

seen through the shells and most of them emerged September 12, seven days after the eggs were deposited. This corresponds with Slingerland's observations in New York, and is undoubtedly, as he suggests, about the average duration of this stage. Several of the larvae were seen to emerge from the egg. In every instance they broke through the upper shell and entered the fruit from some other point. Simpson, however, mentions instances in which the larvae had evidently eaten directly through the lower surface of the shell into the fruit. If such a habit were general, our poison sprays would, of course, be valueless.

THE LARVA.

When first hatched, the young larvae are scarcely more than one-sixteenth inch long, semi-transparent or whitish in color and marked with little black spots, each of which bears a minute hair. The head, and the thoracic and anal shields are black.

True to the instinct of self preservation, the young larvae attempt to get under some protecting cover as soon as possible. Crawling here and there over the surface of the fruit, they seek some secluded spot where they may be hidden from their numerous enemies. This undoubtedly accounts for the fact that a large proportion of them enter the fruit at the blossom end, at the point of contact of two apples, or where a leaf rests upon a fruit. Failing to find such a sheltered spot, the young larvae spins a web of a few silken threads on the surface of the fruit, evidently to give a firmer foothold, and immediately attempts to bite through the skin. One that I observed succeeded only after several ineffectual attempts, and while making these attempts and in burrowing into the fruit, as much haste was exhibited as a soldier under fire would probably exhibit in constructing a rifle pit. In a little more than an hour it had excavated more than its full length into the fruit, enlarged the cavity so that it could turn about in it and spun a silken protecting web across the entrance. The reason is evident why the codling moth in its larval stage within the fruit is subject to the attacks of so few enemies.

Once beneath the skin or within the protecting folds of the calyx, the young larva may feed for several days near the surface, or it may proceed at once towards its objective point, the core, where it feeds upon the seeds and excavates irregular cavities which are filled with masses of filthy droppings matted together with silken threads. Its presence in the fruit can soon be detected by the presence of the familiar frass which is crowded from the burrow and remains matted about the entrance, probably as a further barrier to the entrance of enemies. As it increases in size, the head and the thoracic and anal shields turn from black to brown and the body acquires a pinkish tinge. Some days before it stops feeding the larva eats an extra passage to the surface of the fruit but takes the precaution to close the opening with a protecting pellet of frass and silken threads. When full grown it pushes this pellet aside and leaves the fruit.

The length of time required for the larvae of the first brood to become full grown varies greatly. Some accounts give a period of only ten to fourteen days; others as much as thirty-three days. As stated above, in 1898, the first larva was found in fruit July 1, and not until July 7 could any considerable number be found. The latter were very small, certainly not over four or five days old. They were placed in breeding cages, and July 19 the first one left the fruit and began to spin its cocoon. The others continued to emerge until July 26. This gives in this particular instance a larval period in the fruit of sixteen to twenty-four days.

THE PUPA.

The summer and most fall varieties of apples ripen, and prematurely, when attacked by codling moth. Winter varieties exhibit no such tendency. Whenever an apple containing a larva falls to the ground, the larva usually leaves it at once and seeks some hidden place in which to spin its cocoon. Only very rarely is it spun within the fruit. A very large proportion of the larvae leave the fruit while it is still upon the tree, unless a heavy wind or other agency causes it to fall unusually early, either letting themselves to the ground by silken threads or crawling from the fruit to the twigs and

thence downward along the branches until a suitable place is found in which to pupate. The old neglected orchard is the delight of the codling moth. Amongst the rubbish on the ground and in the fence corners, and under the loose, scaly bark of its moss-covered limbs, are numerous choice spots in which it can pass through its wonderful transformation securely hidden from all foes. Many larvae of the second generation are yet in the fruit when it is gathered and are carried with it into the storerooms. There they too find a suitable place in which to pupate in cracks and crevices about the room and the packages in which the fruit is stored. In fact, when such storerooms are in proximity to orchards, they form a prolific source of infection in spring unless some method is employed to prevent the escape of the moths. It is also certain that the principal means by which the insect is introduced into new regions is in the packages in which infested apples or pears have been packed.

It would be interesting, and perhaps profitable, to know where all the larvae spend their cocoons in well cared for orchards of smooth young trees. Four or five years ago, Mr. H. B. Miller, a successful orchardist of Grants Pass, suggested to me that many of them must pupate in the soil. Mr. Miller based his suggestions on the fact that very few cocoons indeed could be found on his trees; and that he believed he had obtained good results in lessening the amount of codling moth injury in his orchard by frequent cultivation. In 1898, at least 75 per cent of the Ben Davis apples in a certain orchard near Corvallis were rendered unmarketable by codling moth injuries. In fact, the crop was not gathered. Hundreds of wormy apples lay on the ground under every tree. Late in the fall I examined six of these trees carefully. They were not old. The bark was smooth and healthy except for an occasional spot of apple tree anthracnose. On the six trees I found less than half a dozen cocoons. Most of these were in a piece of cloth that had been left in a crotch; only two or three were found on the trees proper, and these were above old anthracnose scars. I was convinced that most of the larvae must be secreted under clods and other objects on the ground or about the crowns of various plants; but together

with an assistant, I spent several hours in searching for them without finding a single one. Neither have I found any in such places in well cultivated orchards. Nevertheless I believe that in well cared for orchards of clean smooth trees, the larvae do spin their cocoons under clods or any other objects that may lie upon the surface of the soil; and that frequent cultivation may thus be of value by destroying them or exposing them to their enemies. August 15, 1900, I found one larva in its cocoon, two live pupae and a number of empty pupa cases in small cracks in the uncultivated soil under an apple tree. The bark on this tree was rough and scaly and considerable rubbish lay on the ground under it. There were thus many normal places in which the larvae could have spun their cocoons; that they chose to do so in the ground would seem to indicate that the habit is not unusual. Cooke states that the cocoons are often found from one to six inches beneath the surface of the soil about the trunk and larger roots. Simpson states that many are placed in cracks in the ground and that a Mr. McPherson reports having found many among the clods of earth in the orchard. Undoubtedly the larvae prefer to pupate under scales of bark on the trunk and larger limbs or in other dry, secluded places above the ground—in breeding cages they almost invariably go to the top—but it seems evident that under certain circumstances they may pupate on or beneath the surface of the soil, and that clean, smooth trees and clean culture are valuable aids in the warfare against this pest.

Having found a suitable place, whether it be on trunk or branch, in barrel, box or storeroom, or under a clod, the larva hollows out a little oval cavity with its jaws and proceeds to envelop itself in a thin, tough cocoon of silken thread intermingled with particles of the surrounding substance. If the cocoon is formed by a larva of the first brood, in July or early August, in two or three days it will undergo a wonderful transformation—a complete change of form. It is then a pupa. A larva of the second brood remains as a larva within its cocoon until the following spring, when it too transforms to a pupa. Whether the change to the pupa occurs in a few days as in the first brood or is delayed until spring as in the

second, the insect remains in the pupal stage only two or three weeks. Then, by wiggling movements, aided by the spines on the back of each segment, the pupa works its way out of its cocoon and is born again. It is then a most beautiful object —the moth. In breeding cages, moths of the first brood emerged August 3, from cocoons that were spun July 19, and in which the larva pupated July 21. Moths of the second brood, which had developed from eggs deposited December 5, and hatched September 12, emerged May 29.

To show more clearly the times at which the moths appear I have compiled the following table from breeding-cage records for 1898 and 1899. Beginning July 7, 1898, when the first wormy apples were found, infested fruit was gathered from time to time throughout the season and placed in cages. The same process was followed in 1899. Careful records of the dates of appearance of the moths was kept throughout the fall of 1898. In 1899, during my absence the records were efficiently kept by Mr. W. J. Gilstrap, a student assistant, until September 7, when he resigned. However, on September 2, he observed that many moths of the second generation had not emerged. It is, therefore, probable that they would have continued to emerge at least until September 15, as in 1898.

NATURAL ENEMIES.

As a moth, flying only at night; as a larva, living in a citadel both entrances to which are barricaded; or as larva and pupa, hidden securely away in the most secluded spots and rendered almost invisible by the protective color of its cocoon; it would seem that the codling moth should be safe from all foes. Nevertheless the mortality is great in each of its various stages.

I have observed many shrivelled eggs that did not hatch. The same condition has been noted by others, notably Koebele, Washburn, and Simpson. Washburn states that, "The moth lays many eggs, but apparently only a certain proportion of them develop." He thus conveys the impression that the mortality is due to lack of fertilization. Simpson attributes it to climatic conditions. Both may be right. I have noticed that in breeding cages protected from the sun nearly every

egg hatches. In California and in the East, a minute parasitic insect lives in and destroys a few of the eggs. It is probably present in Oregon, but I have as yet not detected it.

In Utah a wasp is reported to collect the larvae and store them in its burrow, while the fruit of a neighboring orchard was almost free from injury. In California, another wasp is said to pull the larvae from the apples; while in Indiana the same good office is performed by the downy woodpecker. It is not at all uncommon at Corvallis to find a considerable percentage of the larvae dead in the fruit; some killed by a fungus disease; by a bacterium.

After leaving the fruit, and while seeking a place in which to pupate, the larvae are subject to the attacks of numerous predaceous and parasitic insects and many birds, which also continue to prey upon them both as larvae and pupae after they are hidden away in their cocoons.

Even the moths are captured, while on the wing, by bats and probably many fall a prey to birds, both while at rest during the day and while on the wing at night. At least fifteen species of insects, one hair snake, a fungus disease, a bacterial disease, and many species of birds are known to prey upon the codling moth during some stage of its existence, and yet it ranks as the most destructive apple pest.

The idea of controlling crop pests by their natural enemies is a popular one; and there are not lacking, enthusiasts who advocate, with little reason, the introduction of this or that particular enemy, or the artificial culture and use of one already present, as a cheap and efficient method of controlling the codling moth.

In July, 1898, nearly 80 per cent of the larvae infesting the Waxen apples on a certain tree were killed by disease. Two distinct types of disease were noticeable; one a fungus which produced a solid or mumified condition of the larvae; the other evidently a bacterium which induced decay. I was, at first, impressed with the belief that organisms which naturally produced such a great mortality among the larvae of the codling moth might be successfully used in orchard practice; but when, early in August, the mortality diminished to about 5 per cent or less, while the larvae were much

more abundant, and there was thus more opportunity for the spread of the contagion, I abandoned the idea. It was only too evident that the organisms were too dependent upon favorable conditions for their development, to be reliable agents in insect warfare. Spraying the trees with cultures of these diseases might give good results under certain circumstances; but the results, being so dependent upon conditions, would be uncertain, and the practice therefore unsafe. In all economic work with diseases of insects, two conditions have been found essential to success; the climatic conditions must be favorable for the development of the disease and the insect must be gregarious. The first condition can not be controlled; the second does not exist in this particular instance, the larvae being not only solitary in their habits but deeply buried in the fruit. I, therefore, do not believe the use of disease germs in controlling the codling moth can be made practical.

I fully agree with Slingerland that "the most efficient aids to man in controlling the codling moth are birds. * * * Any one who tries to collect the apple worm on the trunks of trees in early spring, will be surprised to find how many empty cocoons there will be. Usually, however, a telltale hole through the bark into the cocoon explains the absence of the occupant. Our observations lead us to agree with Riley and Walsh that 'almost all the cocoons of the moth that have been constructed in the autumn on the trunks and limbs of apple trees, are gutted before the spring opens.' * * * One finds such an astonishingly large number of empty cocoons that it would seem as though the birds must get the larger proportion of the worms which go into hibernation in the fall." Probably the flickers and nuthatches should be given first rank as codling moth destroyers, but they are ably seconded by the jays, chickadees, wrens, sparrows, swallows, titmice, kinglets, and bluebirds.

I believe there is little prospect that any practical benefit will come from the introduction of foreign enemies of the codling moth, or from attempts to increase the usefulness of those already present. The "strenuous life" of the fruit grower alone will protect his fruit. He must be persistent in the use of the best known remedies. The most successful

Block of Yearling Apple Trees, Russellville Nursery, Oregon

orchardists of the State now rely almost wholly upon spraying.

OTHER PREVENTIVE MEASURES.

Spraying has come to be the chief means of protecting fruit from injury by the codling moth. In this State it is now practically the only means employed. If it be done intelligently and be persisted in, and if a good quality of poison be used, the result should be at least 85-95 per cent of the fruit free from worms. Nevertheless, one should not overlook the facts that clean, smooth trees and clean cultivation are efficient supplements to spraying; that if sheep or hogs are allowed to run in the orchard they will devour the fallen fruit with many worms included; that closed screens at the windows and doors of storerooms in which infested fruit has been kept, means imprisonment for life to all moths that emerge therein in spring. Some good authorities also recommend that the old "banding system" be used as a supplement to spraying. This consists in folding a piece of thick, dark-colored cloth to make bands 4-6 inches wide and fastening these tightly about the trunk of each tree about two feet above the ground. This simply furnishes the larvae convenient places in which to pupate. After the first brood larvae begin to leave the fruit these bands should be examined every six or eight days until about September 15, and all the insects killed. Further examination of the bands can then be deferred until some time after the fruit has all been gathered, when they should again be gone over and all the hibernating larvae killed. The expense of banding is hardly necessary if the spraying has been carefully and intelligently done.

SAN JOSE SCALE.

The San Jose scale is the most destructive of all pests in neglected orchards. Nevertheless, by intelligent effort it can be more easliy controlled than any other first-class orchard pest; and when we come to realize that the one annual winter application of the lime, sulphur, salt spray, which is all that is necessary to reduce its ravages to the minimum, is also one of the best general "cleaning up" sprays that has yet been

devised, we shall, perhaps, be ready to exclaim with J. H. Hale, the veteran peach grower of Connecticut and Georgia, "Blessed be the San Jose scale!" It has compelled us to spray with the lime, sulphur and salt.

One application of lime, sulphur and salt each winter will do more for the neglected orchard than can be done in any other way by the same expenditure of cash and energy. It not only destroys San Jose scale, but it also destroys the branch form of wooly aphis, the eggs of the green aphis, the pear-leaf blister mite, the hibernating larvae of the prune twig-miner, probably the hibernating larvae of the bud moth, together with most other insects which may chance to be wintering upon the trees. It is also a good fungicide. If applied in early winter it is nearly or quite equal to bordeaux for the second application for apple tree anthracnose; applied to peach trees just before the buds open in the spring it is a preventive of peach leaf-curl; and applied to apple trees under similar conditions it is a satisfactory substitute for the application of bordeaux which is usually recommended for that time.

With all its good qualities, however, the lime, sulphur, salt spray is not a cure-all. It does not, so far as known, reduce the number of wormy apples in an orchard, nor can it be used as a substitute for bordeaux while the trees are in foliage. It is a distinctly winter spray and should be used even in winter only upon deciduous trees.

The San Jose scale is very largely responsible for the present enthusiastic crusade against the old, neglected, moss-covered orchards. Everyone is pruning and spraying. Why? To destroy the San Jose scale. Yet I find that a very small percentage of our farmers know what this dread thing is which they are so earnestly endeavoring to destroy. If any other spray than the lime, sulphur and salt were being used, a reaction against all spraying would certainly follow the poor results of so much misdirected energy. By using the lime, sulphur, salt spray, beneficial results are almost certain to follow, whether the scale be present or not. Nevertheless, everyone who grows trees or shrubs should learn to know this destructive little pest and be prepared to combat it, since it

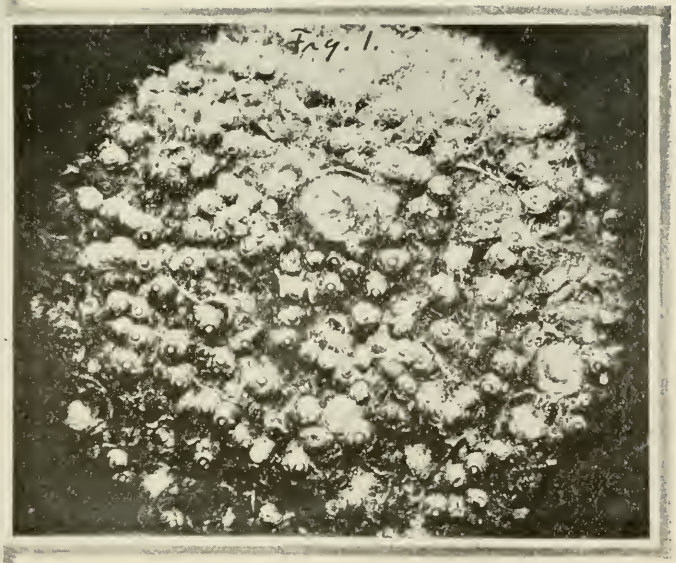


Fig. 1

Fig. 2

may at any time appear upon the ornamentals of the city lot as well as the trees of the old home orchard. Dr. L. O. Howard records it upon the following plants:

List of food plants.—Orchard fruits—Pear, peach, apple, plum, cherry, Rocky Mountain Dwarf cherry, persimmon, quince, Flowering quince. Small fruits—Strawberry. Bush fruits—Raspberry, gooseberry, grape, currant, Flowering currant, Black currant. Nut plants—Almond, chestnut, pecan, Black walnut, English walnut, Japan walnut. Miscellaneous ornamental plants—Forest and shade trees, rose, hawthorn, spirea, cotoneaster, euonymus, English huckleberry, Linden, acacia, elm, Osage orange, alder, sumac, Weeping willow, Red dogwood, juneberry, laurel, English willow, Golden willow, Laurel-leaved willow, milkweed, catalpa speciosa, Lombardy poplar, Silver maple, Carolina poplar, Golden-leaved poplar, Cut-leaved birch, mountain ash, Japanese quince, actinidia, Citrus trifoliata, snowball, loquat, akebia.

HOW TO KNOW THE SAN JOSE SCALE.

Perhaps the worst feature of an attack by San Jose scale is that owing to its small size and inconspicuous color, it often remains unnoticed until the tree has been seriously injured or even killed. That the tree lacks vigor may be recognized, but the cause of its unthriftiness is overlooked. Yet it is not difficult to detect when one really looks for it. In the early stages of infestation a few scales may be found, usually clustered about the buds of the preceding season's growth, or even on two year old wood. The mature scales are grayish in color, being usually but not always somewhat lighter than the bark to which they are so closely attached. The immature, half-grown scales which may be found with the mature ones, are at the present time somewhat darker in color.

The mature females are nearly circular in shape, are approximately one-sixteenth inch in diameter and each is somewhat raised in the center to form a slight protuberance or nipple which is lighter in color than the rest of the scale. (See Fig. 1.) If this scale is carefully examined by means of a small magnifier several concentric circles may be ob-

served between the nipple and the outside edge; and if it be carefully raised with the point of a pin or a knife there will be revealed a minute bright yellow object, the insect itself. (See Fig. 3.)

On badly infested plants the young scales settle wherever there is room to insert a beak into the bark, and as they increase in size they become much crowded and overlapped and have the appearance of a gray, scurvy deposit on the bark. The natural color of the bark is obscured and the infested plant appears as though coated with fine ash-colored bran. If the thumbnail or other object is rubbed over this scurvy covering, thereby crushing the insects beneath the scales, a moist or oily appearance is produced and numerous scales will be overturned and many of the little yellow insects be revealed.

During the early stages of an attack very few if any of the scales will settle upon the leaves or fruit. Later both may be attacked. Upon the leaves, especially of the prune and peach, the young scales may be found on both surfaces, and more particularly clustered along the midrib. Each scale produces a minute purple spot. Upon purple prunes, red apples, etc., the scales appear only as minute gray specks usually clustered about the cavities at either end, but upon the yellow fruits like pears, peaches, and the yellow plums and apples, each scale produces a bright, reddish discoloration. If badly infested, the fruit, particularly of pears and apples, become much pitted, distorted in shape, cracked and unmarketable. (See Fig. 2.)

For the benefit of fruit inspectors in particular, it should be noted that reddish discolorations upon yellow fruits are not always caused by San Jose scale. Upon yellow apples and particularly upon peaches, very similar spots are produced by attacks of certain minute fungi. Hence, such spots should not in themselves be taken as proof of infestation by the scale. The presence of such blotches may well arouse suspicion of the presence of San Jose scale and should challenge a careful examination alike by growers, buyers and inspector; so also should the presence of dead and shrivelled leaves upon the trees in widwinter invite examination for,

although their presence is not proof of the presence of the scale, it is evidence that the vitality of the tree has been seriously impaired by some cause, and in regions where San Jose scale is prevalent that cause, in a vast majority of instances, is the scale.

DEVELOPMENT OF SAN JOSE SCALE.

On the approach of winter scales of various ages and sizes may be found upon infested trees. A very large proportion especially of the immature scales usually perishes during the winter, but at the present writing, March 10, practically all are alive. We may expect, therefore, with normal conditions for the remainder of the season, to witness a very decided increase in scale infestation during the coming summer.

Fig. 1 shows a mature female surrounded by numerous half-grown individuals. The male scales are not circular but somewhat elongate. If one removes one of the large circular scales the little yellow object thereby revealed is a mature female. Under a moderate power of the microscope she proves to be a nearly circular, yellow, sack-like body with long slender bristle-like mouth parts. (See Fig. 3.) An examination of the male shows him to be more elongate and to possess the rudiments of legs, wings, eyes, antennae, etc. (See Fig. 4.) The females live and die beneath their scales—never leaving them; but in April the males molt for the last time and soon thereafter emerge from under their scales as minute, active creatures with fully developed wings. (See Fig. 5.) After mating, the males die.

In May, possibly earlier under favorable conditions, the females begin to give birth to living young and may continue to produce for six weeks or longer. The young are minute, light orange-yellow, active creatures with eyes, bristle-like mouth parts, two antennea or feelers, and six legs. (See Fig. 6.) After emerging from under the protecting scale of the parent each wanders over the surface of bark, leaf or fruit until a suitable situation is found, when the legs and antennae are folded beneath the body, the bristle-like beak is slowly worked through the outer bark into the living tissues beneath, from which it draws its sustenance. At any time

during the summer months hundreds of these little pests may be seen, even with the unaided eye, as they crawl about over the bark or fruit of infested trees.

Even before the young insect has attached itself to the bark the secretion of the scale has begun. At first it consists only of a fluffy white mass of fine, waxy threads, which for the first day or so of its existence causes the young San Jose scale to appear as a minute, downy, white speck upon the bark. As these filaments become more abundant they become fused into a more and more compact scale and assume a yellowish color. Later the young scale-insect molts several times during its growth and the fully developed scale is thus made up of fused wax filaments and the several molted skins.

Each female of the over-wintering generation is capable under favorable conditions of producing approximately one hundred young. In the course of but one month these reach maturity and the females begin to produce another generation. There are thus produced some four or five generations during the entire season. Under supposedly favorable conditions single females of the later generations have been observed to produce approximately six hundred young. Basing their estimates upon breeding-cage observations, Dr. Howard and Mr. Pergande have shown that it would be possible under the most favorable conditions for the progeny of a single female to reach the astonishing number of 3,216,080,400 individuals in a single season. Should each of these scales reach the largest size, one-tenth of an inch, and were they all placed side by side touching each other in all directions there would be enough of them to cover approximately five acres of surface. It is almost needless to add that in the intense struggle for existence of organism with organism and with climatic conditions such an astonishing rate of multiplication is not even approximated under natural conditions. Nevertheless, when one realizes the enormous rapidity with which this pest multiplies it is no longer a surprise that *careless* work in spraying fails to give satisfactory results. A few females here and there upon very small portions of the tree which have not been reached by the spray may dur-

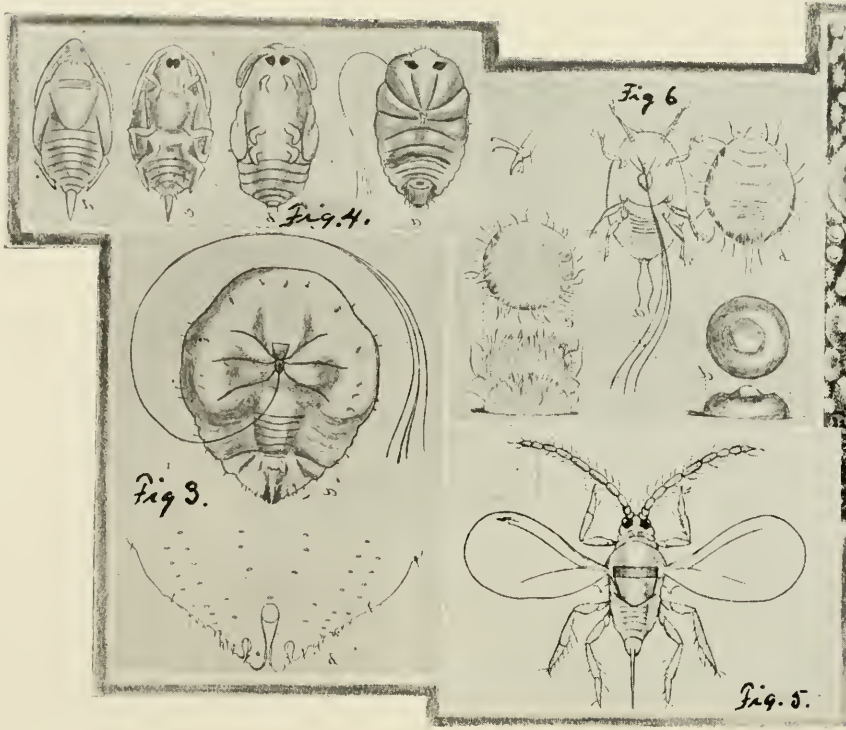


Fig. 4
Fig. 3

Fig. 6
Fig. 5

Fig. 9

ing a single season completely reinfest the tree. Satisfactory results are obtained only by the most thorough work. Every square inch of surface of trunk, limbs, branches and twigs should be thoroughly covered. By far the most common cause of unsatisfactory results is the failure of those who spray to do thorough work.

HOW THE SAN JOSE SCALE SPREADS.

Since the female scale is motionless, and permanently attached throughout life to the branch on which it feeds, it is often asked how is it that the San Jose scale can spread from tree to tree, orchard to orchard, and even for larger distances? It is only during the first few hours of its existence that one of these little pests can emigrate, and observation has shown that even then it is incapable by its own efforts of getting more than a few feet from the tree on which it was born. But birds, and bees, and other insects make good airships for the little creatures, and no doubt many a young scale has crawled upon the foot of a bird or upon some large insect and thereon voyaged to the distant realm of another tree or orchard. No doubt also strong gusts of wind often tear them loose from the bark on which they are crawling and waft them to the branches of neighboring trees. These are provisions of nature for distributing the species. Through the channels of trade they are carried long distances, even from continent to continent upon infested nursery stock, cuttings, etc., and probably to a lesser extent upon infested fruit. Buds and scions carelessly taken from an infested tree may transmit the pest to the orchard in which they are placed or may infest an entire block of trees in some nursery and thence be distributed to many orchards. It is also probable that many are carried about upon the hands and clothing of the men who prune the trees or pick the fruit or otherwise work about the orchards.

By such means has the scale been brought from China, its native home, to San Jose, California, whence in thirty-five years it has spread to practically all the fruit-growing States in the Union and to various foreign countries.

REMEDIES.

There is but one remedy yet discovered which need be considered in this State. That is the lime, sulphur, salt spray. In the East, fairly satisfactory results have been obtained by the use of various preparations of kerosene or other petroleum products, but the high price of kerosene makes it impracticable to use it here in any form for spraying purposes except in a very small way. The San Jose scale has probably been present in this State approximately twenty-five years; and for the past fifteen years the lime, sulphur, salt has been the standard spray for destroying it. During the first few years of its use various formulas were employed and to a less extent this is still true, but since December, 1896, when it was first published in the Biennial Report of the State Board of Horticulture, the formula which has come to be known as the Oregon formula has been the standard in this State.

THE OREGON FORMULA.

This formula was the result of some extensive experiments by the late Emile Schanno, of The Dalles, Oregon, and is as follows:

Quicklime	50 pounds
Sulphur	50 pounds
*Salt	50 pounds
Water	150 gallons

This may be much simplified by designating it as the 1-1-1-3 formula, *i. e.*, 1 pound of lime, 1 pound of sulphur, and 1 pound of salt to each 3 gallons of water. West of the Cascades this formula is more efficient than the 1-1-1-4 formula which is reported to be satisfactory in the Inland Empire.

In preparing this spray it is my plan to put a little water in the bottom of the boiling vat, start the fire, and when the water comes to a boil pour in the required amount of lime and sulphur. The hot water, together with the heat generated by the slaking lime, will at once set the mass to boiling

*Salt may be omitted without loss of efficiency.

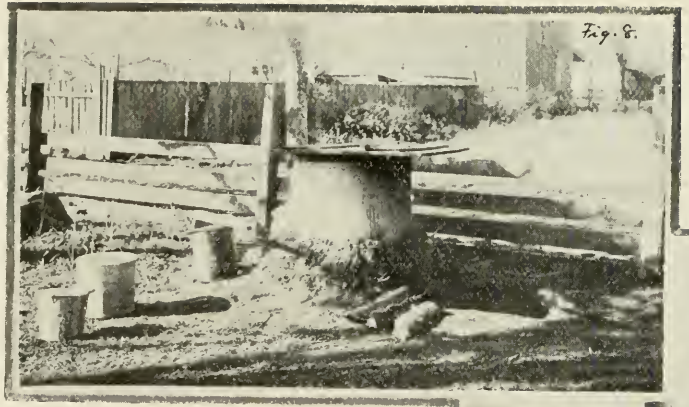


Fig. 8

Fig. 7

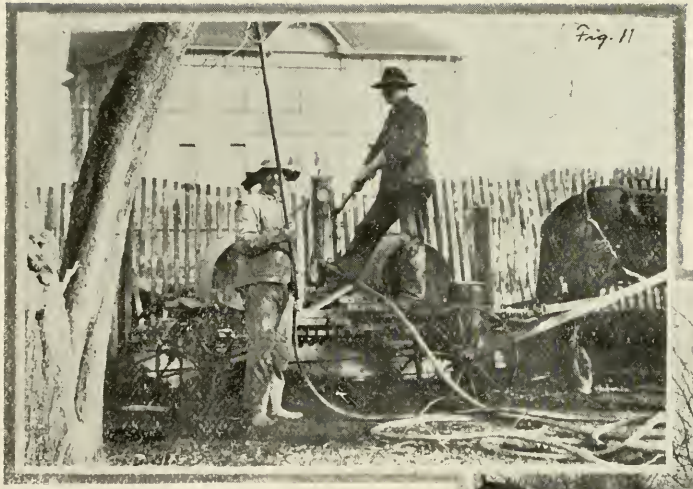


Fig. 11

Fig. 10

briskly. This should be kept up for at least an hour, or until the mixture is of a deep blood-red color, and there is but little free sulphur floating upon the surface.

Plate 3 is reproduced from photographs of two simple boiling vats. Fig. 7 is simply a "hog scalding" vat made of "inch-and-a-half" lumber and with galvanized iron bottom. It is eighteen inches wide on the bottom, twenty inches wide on top, and ten feet long. The sides should project two or three inches beyond the end and the galvanized iron of which the bottom is made should project at each end six inches beyond the sides, and then be turned up and fastened securely, thus forming shallow troughs at each end which must be kept filled with water to keep the ends from burning.

These vats may readily be set up wherever there is a convenient water supply by simply digging a trench of the proper dimensions, placing the vat over it and banking about with earth to prevent the fire from reaching the wooden sides. A better draft is secured by erecting a few feet of stove pipe at the back end. If the vat is to be permanently located it is of course preferable to mount it upon a brick arch. With such an apparatus one can readily prepare the spray as fast as it can be used by a power spraying outfit running two lines of hose.

If one possess a steam boiler the spray can be most conveniently boiled in a number of barrels or in large wooden vats, the steam being conveyed to the bottom of the barrels or vats. Thus liberated it not only boils the spray but keeps it well stired the while, thus eliminating much of the drudgery of stirring by hand which is incident to other methods.

ENEMIES OF THE SAN JOSE SCALE.

At present I can offer no encouragement to those who desire to see the San Jose scale held in check by its natural enemies. In August, 1903, I received through the courtesy of Dr. L. O. Howard, a small consignment of the Chinese Lady-bird Beetle (*Chilocorus similis.*) These were liberated at Jacksonville, Oregon, in an abandoned pear thicket, on the premises of Mayor E. Britt. This thicket was badly infested with scale, Mr. Britt undertook to see that it should not be

sprayed or destroyed during the time of the experiment, and strong hopes were entertained that the extremely favorable conditions would result in a flourishing colony from which beetles could later be distributed to other parts of the State. Several months after the beetles were liberated Mr. Britt and Mr. Chas. Meserve succeeded in finding more than twenty of them still alive and apparently in good condition, but by the following July all had apparently perished, as a most thorough search by Mr. Meserve and myself failed to reveal any trace of them or their progeny, and similar negative results were obtained from another examination the following year.

A closely related native species, *Chilocorus bivulnerus*, has been reported by Mr. A. H. Carson, Horticultural Commissioner for the third district, to have practically exterminated the San Jose scale from a badly infested orchard near Grants Pass. The late Emile Schanno, The Dalles, Oregon, in 1896, sent me a number of specimens of this species, with the report that they were very abundant upon fir trees, which were infested with a closely related scale, *Aspidiotus abietis;* but no other reports of such habits have been received and I myself have never observed them.

The much smaller, entirely black, native species, *Pentilia misella*, is much more generally distributed and undoubtedly destroys a great many scales, but for some reason it does not increase rapidly enough to keep pace with the increase of the scale, which appears, likewise, to be true of the three or four internal parasites which have been reared from San Jose scale from various parts of the country.

APPLE TREE ANTHRACNOSE.

Less than a decade has passed since those well versed in horticultural affairs were predicting destruction of the apple-growing industry in the humid portions of the Pacific Northwest by a disease which was variously known as "canker," "dead spot," or "black spot." Nevertheless, in the last report of the Oregon State Board of Horticulture, President E. L. Smith and Commissioner Carson both express the firm conviction, based upon personal observation in sprayed orchards,

that the disease can be satisfactorily controlled by the methods recommended in Bulletin No. 60 of the Oregon Experiment Station.

HISTORICAL.

Apple tree anthracnose is a disease of the apple bark which, so far as known, is confined to the Pacific Northwest. Whether or not it has been communicated to the apple from some of our native plants is not known. It seems first to have been noticed about 1891 or 1892, and by 1893 or 1894 had attracted so much attention that upon request of the Boards of Horticulture of Oregon and Washington, Dr. Newton B. Pierce, of the Division of Vegetable Pathology of the United States Department of Agriculture, was detailed to make an investigation of the trouble. Dr. Pierce spent some time investigating conditions in the worst infested regions and, although I am not aware that he published any detailed report of his investigations, he evidently obtained an approximately accurate insight into the nature of the disease. In a letter to the late Mr. J. M. Wallace, of Salem, Oregon, Dr. Pierce wrote: "My work in Oregon and later at this laboratory, has demonstrated one thing beyond a reasonable doubt, namely, that the apple canker so common in Oregon is a disease due to the action of a parasitic fungus. Inoculation experiments here have reproduced the disease in a typical form in perfectly healthy apple trees. * * * I have found the various spore forms, as well as the tree which probably forms the active host of the parasite in Oregon and Washington. It has also become evident that the fungus works mostly during the rainy season, and that infection of new trees may take place in the fall and during most if not quite all winter. This shows that trees must be treated before the rains begin and often during the winter to prevent infection of new unaffected tissues."

In 1899, owing to repeated and urgent calls upon the Experiment Station for information regarding this disease, the writer, in the absence of a regular plant pathologist, started an investigation, the results of which were published in the Bulletin No. 60, above mentioned, and in which the disease was definitely proved to be due to the attacks of a particular

fungus which was described, its method of development indicated and methods for its prevention suggested. Recently Professor Lawrence, of the Washington Experiment Station, has added the interesting information that the same fungus causes a rot of the apple and that by artificial inoculation he has succeeded in producing cankers upon cherry, prune, and pear trees.

CONFUSION OF NAMES.

As stated above the disease was variously known as "canker," "dead spot," and "black spot." Ordinarily it is best to accept a common name when once well established, but in this particular instance we believed that since there were three common names about equally well established, that confusion in the designation of the disease could best be avoided by adopting for it an entirely new name. This seemed all the more necessary by reason of the fact that all of the above names were applied indiscriminately to various diseases of widely different natures. I therefore proposed for this particular disease the name apple tree anthracnose, a name which has since become well established locally and in mycological literature, but which evidently is not so well established in our neighboring State, since in a recent bulletin Professor Lawrence, "in order to retain uniformity of names," proposes still another name, "black-spot canker."

NATURE OF INJURY.

Apple tree anthracnose attacks principally the smaller branches—those under two inches in diameter—although it also occurs upon larger ones and on the trunks of young trees. The character of the injury produced is well shown in Figs. 7, 8, 9, 10. It usually appears first in the fall upon one and two-year-old wood, soon after the autumn rains begin, as small circular, sometimes slightly depressed, brown areas of the bark, which will continue to increase in number until mid-winter, the larger proportion appearing during the months of November and December. During the tree's dormant period these diseased areas apparently increase in size very slowly, although the fungus penetrates to the cambium in which it may spread considerably beyond the limits of the

superficial canker; but with the advent of warmer weather in spring, with its induced physiological activities, they may increase in size rapidly until, under favorable conditions, the disease may invade an area several inches in diameter by the last of May or early June. At that time the increase in size of the canker spots and the energies of the fungus are thence devoted wholly to the production of spores. At that time the diseased areas are dark brown in color, markedly depressed, and usually limited by ragged irregular fissures which separate the dead from the surrounding living tissues. (See Fig. 8.) These dead spots vary in size from those not more than one-half inch in diameter to extensive areas three or four inches wide by six or eight long. Even larger diseased areas are sometimes produced by the union of two or more cankers.

EXTENT OF INJURY.

It is difficult to form an estimate of the extent of the injury caused by this disease. To be sure, orchards have been completely ruined by it, but in the vast majority of orchards its presence is indicated only by more or less numerous ugly wounds upon the branches. Occasionally a single canker completely girdles a branch on the trunk of a young tree, thus killing at once its distal portion (See Fig. 10), but more commonly only a dead spot occurs from which in the course of a few months the bark sloughs off, leaving an ugly wound which requires several years to heal. (See Fig. 9.) When these wounds were at all numerous the branches are much disfigured and are moreover greatly weakened. It is not at all uncommon, however, for trees which have been seriously injured to continue to bear fair crops of fruit year after year.

CAUSE OF THE INJURY.

Many theories have been advanced regarding the cause of this disease, among which may be mentioned insect injury, sour sap, frost, sun-scald, fire blight, etc., and indeed most of these causes may produce injuries which superficially resemble apple tree anthracnose in its early stages. There is no longer any doubt, however, that this disease is produced by a particular fungus, *Gloesporium malicorticis.*

A few words of explanation as to what is meant by a fungus may serve to make my meaning clear to some fruit growers who have given the matter little or no attention.

WHAT IS A FUNGUS?

A fungus is a plant as truly as is the apple tree, the prune tree, the wheat plant, or any other plant upon which it may be growing. In this particular case it is a very small—a microscopic plant.

Fungii differ from ordinary plants essentially in being much more simple in structure, and in being devoid of chlorophyll—the green coloring matter of plants. The seeds, which are called spores, are more simple and very much smaller than the smallest seeds of common plants, and are produced in almost inconceivably great numbers. The vegetative portion of a fungus, the part which, in a sense, corresponds to the roots, stems and leaves of ordinary plants, the part which absorbs the food materials and builds them up into new tissue and eventually produces the spores, consists of a mass of more or less branched white or colorless and very minute threads and is called the mycelium.

The spores, being so small and light, are readily carried long distances by the wind, are washed about by the rains and may also be carried by birds and insects and probably other agencies. It is one or more of these methods that fungous diseases are spread from leaf to leaf, tree to tree, or orchard to orchard. Over greater distances the spores may be carried on shipments of infested nursery stock, fresh fruits, vegetables, seeds, etc.

Should a spore fall upon suitable soil, such as the surface of leaf or fruit, and the conditions of heat and moisture be favorable, it will germinate—push out a delicate, slender, germ-tube or "rootlet." In the case of most parasitic fungii this germ-tube soon penetrates the epidermis of the leaf or fruit or bark, and the mycelium develops in the underlying tissues entirely beyond the reach of fungicides.

HOW THE ANTHRACNOSE FUNGUS SPREADS.

If, now, one were to examine an anthracnosed spot, of the current season's growth, one would observe that the bark is

thickly set with minute pimples or pustules. These are acervuli and contain the spores of the fungus. These acervuli begin to appear early in June. At first they appear as small conical elevations of the epidermis which are scattered more or less irregularly over the diseased bark. By the end of June they have increased considerably in size and occasionally one may be found which has burst open, thus exposing to view the cream-colored mass of spores, which, however, soon become dark colored. During July, August and September the acervuli become more and more abundant and by the first of November a very large proportion of them has opened for the purpose of discharging their spores.

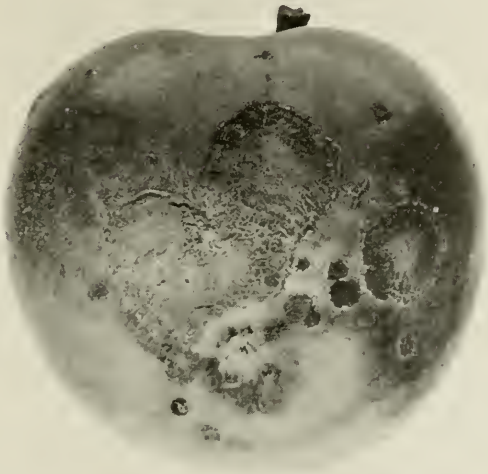
How carefully nature looks after her own and guards against needless waste is well illustrated by this fungus. Each acervulus contains thousands of spores, and were they free to be distributed by the winds of summer, countless millions would perish before the arrival of climatic conditions favorable for this germination. But the spores are not free. They are firmly held in a gelatinous mixture which is comparatively dry and hard during the warm summer months, but which, upon the advent of the fall rains, gradually softens and dissolves, thus slowly liberating the spores just when the conditions are most favorable for their germination and growth. Once liberated the spores are doubtless distributed by wind, rain and other agencies.

A vast majority of the spores undoubtedly fall on uncongenial places and perish; but an occasional one may find suitable lodgment in a suitable place on the bark of some limb, and if temperature and moisture conditions are right it germinates. The delicate germ-tube penetrates the epidermis and after thus gaining access to the underlying tissues the mycelium ramifies through them, spreading in all directions, absorbing the nourishment upon which it grows, and killing the surrounding cells. This distribution and germination of spores, with the consequent formation of new cankers, may continue from the time of the first fall rains until mid-winter or later, but the most active period is during November and December. During the winter, as previously stated, the growth of the fungus and the consequent increase in size of

the anthracnose spots is slow, but in the spring the mycelium takes on a renewed activity, which is shown by the rapid increase in size of the cankers. In May and June the fungus reaches the fruiting stage and from that time on all its energies are devoted to the production of spores. The cankers then cease to increase in size and become surrounded by ragged fissures. Soon the mycelium dies, the wound begins to heal by the formation of new cellular tissue and in the course of months the dead bark sloughs off, exposing the ugly wound.

PROOF OF ITS FUNGUS ORIGIN.

We have stated above that the disease is caused by the fungus *Gloesporium malicorticis*. It may be of interest to orchardists to know something of the evidence upon which we base the assertion. In brief it is as follows: Spores were induced to grow in artificial cultures. As they germinated they were examined under the microscope, and when they had developed so that they could be seen by the unaided eye, they were separated from all other growths and transferred to other artificial cultures. This has been repeated many times and in different ways to eliminate all sources of error. When convinced that no other living organisms were present in the cultures a number of sections of apple limb were inoculated with this "pure culture" of the fungus. In about a week after these inoculations were made slightly discolored areas were observed about several of the points of infection, and in three weeks these areas had developed all the characteristics of the disease. This was the preliminary work. Later, twenty young apple trees in the College orchard were inoculated with similar cultures. Every tree developed a typical case of anthracnose. Fig. 10 is from a photograph of one of these trees which had been girdled by the disease and the top killed. Fig. 7 is also a photograph of a section of one of these trees taken about a year after the inoculations were made, to show the wound and the formation of callular tissue. These experiments have been repeated many times, and almost invariably result in the development of typical cases of anthracnose.



Scabby Apple

Scabby Apple

Injured by Scab Fungus

Defoliated by Scab Fungus. Not Sprayed

Adjoining Orchard, Sprayed. Foliage Perfectly Healthy

REMEDIES.

In Bulletin No. 60, as a result of laboratory studies, I made the following recommendations: We have seen that the spores are developed and probably distributed during the late summer and fall months, and that they undoubtedly germinate after the fall rains begin. It is also known that bordeaux mixture and other copper compounds prevent the germination of the spores of fungii. We therefore infer that if the trees be thoroughly sprayed with bordeaux mixture or with the ammoniacal solution of copper carbonate once soon after the fall rains begin, and again as soon after the leaves fall as possible, the germination of the spores will be largely prevented and the spread of the disease be thereby checked. It is not expected that such a process will exterminate the disease, but it is believed that it will so reduce its ravages that it can no longer be considered a menace to the apple-growing industry. For the latter of the two applications mentioned above, bordeaux mixture, winter strength, should be used. For the former, bordeaux, summer strength, may also be used, but if fruit is on the tree it would be better to use the ammoniacal solution of copper carbonate. Whichever spray is used should be thoroughly applied and applied as soon as possible after the fall rains begin. The fungus can not be destroyed by sprays after it has once entered the tissues of its host.

In addition to the sprayings recommended, we would advise owners of young orchards, or orchards but little diseased, to carefully cut out and paint over with strong bordeaux all anthracnosed spots that may be observed. Old or badly diseased orchards can best be renovated by pruning severely and spraying thoroughly.

Such excellent results have followed the adoption of the above recommendations in several instances that I hesitate to modify them. I am inclined to believe, however, as a result of later studies, that there is no necessity of spraying for this disease before the crop is harvested, particularly if the trees have been sprayed with bordeaux early in the season for apple scab. I believe now that it is most important

to have the trees thoroughly protected by a fungicide during November and December, and hence would recommend that a thorough application of bordeaux be made soon after the fruit is gathered, this to be followed after the leaves are off with another application of bordeaux or of lime-sulphur solution.

The results of fall spraying with bordeaux are very clearly demonstrated in the orchard of Eisman Brothers, of Grants Pass, Oregon. To quote from Mr. Carson's report in the Eighth Biennial Report of the Oregon State Board of Horticulture: "Eisman Brothers own an apple orchard of thirty-five acres near Grants Pass, which in 1901 was so badly diseased with anthracnose that they were about to dig it up. Every tree in the orchard was diseased with this fungus. Nearly all of the tops of the trees were dead or dying. The vitality of the orchard was so low that it did not produce enough apples to pay expenses. The brothers worked faithfully, cutting out dead spots and dead wood during early spring months, but the fungus continued to increase. At my suggestion Eisman Brothers began spraying with bordeaux early in the fall before the leaves were off the trees, as suggested in Professor Cordley's bulletin. The benefits of their first fall spraying were very pronounced. The spring following showed but very little new tissue affected with the fungus. Eisman Brothers followed up their spraying in the fall of 1902-03 and to-day (1904) their orchard is very vigorous and free of the fungus."

Several other striking illustrations of the beneficial effects of fall spraying for anthracnose could be mentioned, but probably enough has been given to at least convince one having a diseased orchard of the advisability of giving the method a thorough trial. Should such be the case I should consider it a great favor to be informed of the results, be they good or bad.

APPLE SCAB.

West of the Cascades apple scab is one of the most serious drawbacks to apple growing. The abundant rains and cool weather in fall provide favorable conditions for the growth of the fungus upon the leaves, and thus provide abundantly for

the winter stage which may be found later upon the fallen leaves; while similar conditions in spring provide equally favorable conditions for its spread upon the young leaves, blossoms and fruit.

No extensive discussion of the disease is necessary at this time. Suffice to say that it appears first in spring upon the young leaves even before the blossoms appear. It also appears on the blossoms and may so seriously injure the young fruit as to cause much of it to drop; or cause such blotches upon the mature fruit as to make it worthless for market purposes. In cases of serious infestation the disease so injures the leaves that the trees may become nearly defoliated in September or October, thus cutting off the nourishment which should go to developing fruit buds.

The accompanying illustrations will serve to show the nature of these injuries to leaf and fruit.

The disease can, however, be very satisfactorily controlled by spring spraying with bordeaux mixture. In the spring of 1903, experiments in spraying for this disease were conducted in an orchard of Newtown Pippin trees. This particular block of trees was selected, first, because the Newtown Pippin is one of the varieties most susceptible to apple scab in the Willamette Valley; second, because the orchard has been neglected for years. It is now about fifteen years old, has never been thoroughly cultivated, and has been sprayed but two seasons, during one of which it received but one application.

The orchard was sprayed five times the past season, with the 4-4-50 bordeaux, viz., on April 30, May 14 to 19, June 1 to 3, July 1 to 3, and August 15. The last two applications were made more particularly for the codling moth, only the poison being used. These applications no doubt were practically of no value as a preventive of scab, only the first three being of any benefit. The climatic conditions were particularly favorable to the development of the scab. This was particularly true during the time of the second spraying, May 14 to 19, when the showers were almost continuous. Thus the application which should have done more good than any other was made under very adverse circumstances, being

made between showers or even when the rain was falling. Near the middle of this block of trees, eleven trees were left unsprayed, and at picking time four trees were selected, two sprayed and two unsprayed, which stood near together and were as nearly alike as it was possible to select. The fruit from each tree was carefully gathered and divided into three grades. The first consisted of fruit entirely free from scab; the second, of that which was slightly scabby—that is, fruit that had only one or two slight specks of scab; and third, of fruit that was very scabby. There was also such a noticeable difference in the size of the fruit from the sprayed and the unsprayed trees that the fruit was then regarded upon the basis of size, in an attempt to determine the amount of this increase. This was done, first by measuring the fruit with calipers, and second, by weighing it. In measuring the fruit the points of the calipers were set two and one-half inches apart and every apple that could be passed between the points was placed in the culls.

The following table shows the results of spraying with bordeaux, both on the amount of scab and upon the size of the fruit:

TABLE SHOWING EFFECT OF SPRAYING UPON THE AMOUNT OF SCAB AND SIZE OF FRUIT.

Number.	Treatment.	Total No. of apples.	Very scabby.	Slightly scabby.	Free from scab.	No. over 2 1-2 in in diam.	Weight, pounds.	No. less 2 1-2 in in diam.	Weight, pounds.
1	Sprayed	1,050	128	110	812	668	180	382	71
2	Sprayed	852	191	139	522	479	125	373	56
3	Not sprayed	912	737	424	51	334	84	578	99
4	Not sprayed	1,205	909	196	200	320	82	883	148

To summarize the results: The two trees that were not sprayed bore 215 apples more than the others, but the trees that were sprayed bore approximately ten times as much fruit free from scab as the trees that were not sprayed, or to state it in percentages, on the trees that were not sprayed only 7 per cent of the fruit was free from scab, while on those that were sprayed 70 per cent of the fruit was free from scab. On the two trees that were sprayed, of the 1,902 apples borne, 1,147 measured over two and one-half inches in dia-

Pears Grown and Packed by Eisman Brothers, Grants Pass, Oregon

meter and 755 measured less than that. Their total weight was 432 pounds, of which 70 per cent was of marketable size. On the trees that were not sprayed, of the 2,117 apples borne, only 654 were more than two and one-half inches in diameter and 1,463 were less than that. Their total weight was only 313 pounds, of which but 53 per cent was of marketable size.

The sprayed trees bore approximately ten times as much fruit free from scab, and nearly twice as many pounds of fruit over two and one-half inches in diameter as did the unsprayed trees.

A study of the above table shows that the fruit on all the trees was small. This was to be expected, from the fact that the orchard has never been properly cared for and during the progress of the experiment received only the most cursory cultivation. Of approximately 2,500 boxes of fruit borne by the 400 trees, there were not over 600 boxes of four and five tier fruit. The small size, however, could not in any way be attributed to the spraying since the figures show nearly twice as much fruit of marketable size upon the sprayed as upon those unsprayed.

REPORT OF COMMISSIONER SECOND DISTRICT.

To the President and Members of the State Board of Horticulture:

I herewith submit my biennial report for the term ending in the year 1906. The Second Horticultural District of the State of Oregon comprises the counties of Marion, Linn, Lane, Polk, Benton, and Lincoln, the most of which is located in the Willamette Valley.

The orchards are numerous and small, the most of which are old and have been neglected; young orchards present an entirely different appearance from the pioneer orchards.

The work during the past two years has been to clean up the old orchards and instill in the owners of them the idea that fruit may be grown in the Willamette Valley with greater profit than most any other produce they may raise, consequently there has been more pruning and spraying of these old orchards in the past two years than there has been in the twenty years preceding.

The county inspectors for the various counties have organized county fruit associations and have held many beneficial meetings in various parts of their respective counties.

Intelligent fruit growers in other parts of the State have demonstrated that the apples grown in Oregon can not be surpassed, and in their respective communities the price of land has been greatly enhanced by reason of the handsome returns they receive from their crops.

We of the Willamette Valley have demonstrated that, using the same degree of intelligence in growing fruit and preparing the same for market, we can present to the consumer fruit which is equal to any that is grown in the State.

I think that the Willamette Valley offers better inducements to those wishing to go into the fruit-growing business than any other part of Oregon; we have sufficient moisture so that irrigation is unnecessary; the wind velocity is low, and thus

the orchardist is not prevented from spraying his trees at the proper time and can carry on his work throughout the day without being compelled to suspend proceedings at 9 o'clock in the morning. The snows and ice have never been known to break down the limbs of the trees in winter time, and codling moth does not seem to be as bad here as in other parts of the State, and is not found west of the Coast Range.

Land that will grow pears and apples may be purchased in the Willamette Valley at from $10 to $75 per acre, and there is plenty of it.

The Wallace orchard, situated in Polk County, near Salem, produced last year from seventy acres of pears, 13,000 boxes of Bartletts and 3,000 boxes of Fall pears; from forty-five acres of apples, produced 18,000 boxes; a small acreage of loganberries in Mission Bottom produced ninety tons of fruit; these are specific instances.

It is estimated that in this district there was produced this year, the following:

12,000,000 pounds prunes, valued at	$400,000.00
150,000 boxes apples, valued at	100,000.00
50,000 boxes pears, valued at	35,000.00
8,000 boxes peaches, valued at	5,000.00
1,600,000 pounds cherries, valued at	70,000.00
100,000 pounds strawberries, valued at	4,000.00
Loganberries and other small fruits, estimated at	20,000.00
	$634,000.00

In this district there has been much enthusiasm lately concerning the planting of English walnuts. The Oregon Nursery Company, of Salem, has secured a fine strain of the Franquette walnut, which promises to be a nut adapted to this climate. There has been planted to walnuts during the past two years about 1,000 acres; we trust that within ten or twelve years we can furnish many carload lots of one kind of nuts.

I would suggest to those who are contemplating the planting of walnuts to set out the best trees obtainable; the grafted trees will produce a quality with certainty.

This district seems to be particularly adapted to the growing of nursery stock, as those engaged in the same found to

their profit; it is estimated that about 4,000,000 nursery trees have been grown during this year.

I will make no comments upon the subject of spraying the various kinds of fruits, as this subject is fully covered by other portions of this report.

Respectfully submitted,

CHAS. A. PARK,
Commissioner of the Second District.

Apple Tree Affected with Leaf Blight

APPENDIX.

HORTICULTURAL LAW.

AS PASSED BY THE LEGISLATURE, FEBRUARY, 1895.

An act to amend an act entitled "An act to create a State Board of Horticulture and appropriate money therefor," approved February 25, 1889, and an act amendatory thereof entitled "An act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889," approved February 21, 1891, and to protect the horticultural industry in Oregon.

Be it enacted by the Legislative Assembly of the State of Oregon:

Section 1. There is hereby created a Board of Horticulture to consist of six members, who shall be appointed by a board, consisting of the Governor, Secretary of State, and State Treasurer. One member of the said Board of Horticulture shall represent the State at large, and one member shall be appointed to represent each of the five districts as hereby created, to-wit (provided that the commissioner-at-large shall not receive any pay for his services): (1) The First District, which shall comprise the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook; (2) the Second District, which shall comprise the counties of Marion, Polk, Benton, Lincoln, Linn, and Lane; (3) the Third District, which shall comprise the counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake; (4) the Fourth District, which shall comprise the counties of Wasco, Sherman, Morrow, Gilliam, and Crook; (5) the Fifth District, which shall comprise the counties of Umatilla, Union, Wallowa, Baker, Malheur, Harney, and Grant.

Section 2. The members shall reside in the districts for which they are respectively appointed. They shall be selected with reference to their knowledge of and practical experience in horticulture and the industries connected therewith. They shall hold office for the term of four years, and until their successors are appointed and have qualified; but the members of said Board now in office shall hold office till the expiration of the term for which they were appointed.

Section 3. Said Board shall employ from without their number a secretary, who shall exercise the powers and discharge the duties conferred upon him by this act, and whose compensation shall not exceed $75 per month, to be paid in the same manner as other State officers. Said Board shall also elect from their own number a treasurer, who shall give a bond to the Governor of the State of Oregon in the sum of $10,000, conditioned upon the faithful discharge of his duties. Before entering upon the discharge of his duties, each member of the

Board shall make and subscribe an oath to support the Constitution of the United States and of the State of Oregon, and to diligently, faithfully, and impartially discharge the duties of his office, which said oaths shall be filed with the secretary. The secretary shall make and subscribe a like oath, which shall be filed with the treasurer of the Board.

Section 4. The Board may receive, manage, use, and hold donations and bequests of money and property for promoting the objects of its formation. It shall meet on the second Mondays of April and October of each year, and as much oftener as it may deem expedient for consultation and for the adoption of those measures which will best promote the horticultural industries of the State. It may, but without expense to the State, select and appoint competent and qualified persons to lecture in each of the districts named in section 1 of this act, for the purpose of encouraging and improving practical horticulture, and of imparting instruction in the best methods of treating the diseases of fruit and fruit trees, cleansing orchards, and exterminating insect pests.

Section 5. The office of the Board shall be located in such place as a majority thereof may determine. It shall be kept open to the public, subject to the rules of the Board, every day excepting Sundays and legal holidays, and shall be in charge of the secretary during the absence of the Board.

Section 6. For the purpose of preventing the introduction into the State or spread of contagious diseases, insects, pests, or fungous growths among fruit or fruit trees, and for the prevention, treatment, cure, and extirpation of fruit pests, and diseases of fruit and fruit trees, and for the disinfection of grafts, scions, orchard debris, fruit boxes and packages, and other material or transportable articles dangerous to orchards, fruit or fruit trees, said Board may make regulations for the quarantining, inspection, and disinfection thereof, which said regulations shall be circulated by the Board in printed form among the fruit growers and fruit dealers of the State; shall be published at least four successive times in some daily or weekly paper in each county in the State before the same shall be in force therein, and shall be posted in three conspicuous places in each county in the State, one of which shall be at the county court house. Such regulations, when so promulgated, shall be held to import notice of their contents to all persons within the State, and shall be binding upon all persons therein. A willful violation of any quarantine or other regulation of said Board, necessary to prevent the introduction into the State, or the shipment, sale or distribution of any article so infected as to be dangerous to the fruit-growing interest of the State, or the spread of dangerous diseases among fruit trees or orchards, shall be deemed a misdemeanor, and on conviction thereof shall be punished by a fine of not less than $5 nor more than $100 for each offense, or by fine and imprisonment, not less than five nor more than thirty days.

Section 7. It shall be the duty of the several members of the Board, and the secretary under their direction, to visit their respective districts

and to see that all regulations of the Board and all provisions of law to prevent the introduction or spread of fruit pests and diseases of trees or plants injurious to the horticultural interests of the State are enforced. Any member of the Board, or secretary thereof, shall forthwith, upon the complaint of interested parties, inspect orchards, nurseries and other places suspected to be infested with fruit pests or infected with contagious diseases injurious to the trees, plants or fruits. If, upon report of any member or the secretary, the Board shall be of the opinion that any locality, district, orchard or place is infested with fruit pests, or infected with contagious diseases, or injurious to trees, plants, or fruits, and liable to spread to other orchards or localities to their damage or injury so as to be a public danger, said Board shall, by an order entered upon its minutes, declare such place to be under quarantine, and shall give notice thereof by posting a notice in writing in a conspicuous place upon the premises, specifying with convenient certainty what place or premises are under quarantine regulations, and by delivering a copy of such notice to the owner or person in charge of the premises, if he may be found thereon; and such place shall thereafter be subject to quarantine regulations of the Board, and violation thereof shall be punishable as hereinbefore provided. As soon as, in the opinion of any member of the Board or the secretary thereof, the danger from such quarantine locality shall have ceased, he may suspend the said quarantine, and shall immediately report the fact to the Board, who may confirm such action or may re-establish the said quarantine, in which case it shall not be again suspended but by action of the Board.

Section 8. The Board, and, in case of necessity during the recess of the Board, the member residing in the quarantined district, or the secretary, may appoint such quarantine guardian as may be needed to carry out the provisions of this act, whose duty it shall be to see that the regulations of the Board and the instructions of the secretary are enforced and carried out. They shall also report to the Board all infractions or violations of said regulations or the law in regard to quarantining, disinfection, and destruction of pests. The salary of quarantine guardians shall be fixed by the Board at not to exceed $2 per day, and shall be paid by the owners of orchards or other places under quarantine, and they may maintain an action therefor before any justice of the peace in any district in which any quarantined locality is wholly or in part located; but in no case shall they have any claim upon the State for such services.

Section 9. The powers conferred in the two preceding sections of this act shall be exercised only in great and imminent danger to the fruit interests of the State, and with the utmost caution and regard for the rights of individuals affected, consistent with the safety and welfare of the fruit interests of the whole State.

Section 10. It shall be the duty of the several members of the Board, and of the secretary, under their direction, whenever they shall deem it necessary, to cause an inspection to be made of any orchard, nurseries,

trees, plants, vegetables, vines, or any fruit packing house, storeroom, salesroom, or any other place within their districts, and if found infested with any pests, diseases or fungous growths injurious to fruits, plants, vegetables, trees, or vines, or with their eggs or larvae, liable to spread to other places or localities, or such nature as to be a public danger, they shall notify the owner or owners, or person in charge of or in possession of such articles, things or places, that the same are so infested, and shall require said persons to eradicate or destroy said insects or pests, or their eggs or larvae, or to treat such contagious diseases within a certain time, to be specified in said notice. Said notices may be served upon the person or persons, or any of them, owning, having charge, or having possession of such infested place, article, or thing, by any member of the Board, or by the secretary thereof, or by any person deputized by the said Board for that purpose, or they may be served in the same manner as a summons in an action at law. Such notice shall contain directions for the application of some treatment approved by the commissioners for the eradication or destruction of said pests, or the eggs or larvae thereof, or the treatment of contagious diseases or fungous growths. Any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruits or articles thus infested are hereby declared to be a public nuisance; and whenever any such nuisance shall exist at any place in the State on the property of any owner or owners upon whom or upon the person in charge or possession of whose property notice has been served as aforesaid, and who shall have failed or refused to abate the same within the time specified in such notice, or on the property of any non-resident or any property not in the possession of any person, and the owner or owners of which can not be found by the resident member of the Board or the secretary, after diligent search within the district, it shall be the duty of the Board, or the member thereof in whose district said nuisance shall exist, or the secretary under his or their direction, to cause such nuisance to be at once abated, by eradicating or destroying said insects or pests, or their eggs or larvae, or by treating or disinfecting the infested or diseased articles. The expense thereof shall be a county charge, and the county court shall allow and pay the same out of the general fund of the county. Any and all sums so paid shall be and become a lien upon the property and premises from which said nuisance shall have been removed or abated, in pursuance of this act, and may be recovered by a suit in equity against such property or premises; which suit to foreclose such liens shall be brought in the circuit court of the county where the premises are situated, by the district attorney, in the name and for the benefit of the county making such payments. The proceedings in such cases shall be governed by the same rules, as far as may be applicable, as suits to foreclose mechanics' liens, and the property shall be sold under the order of the court, and the proceeds applied in like manner. The Board is hereby invested with the power to cause such nuisances to be abated in a summary manner.

Section 11. It shall be the duty of the secretary to attend all meetings of the Board, and to preserve records of the proceedings, correspondence and actions of the Board, to collect books, pamphlets, periodicals, and other documents, containing valuable information relating to horticulture, and to preserve the same; to collect statistics and general information, showing the actual condition and progress of horticulture in this State and elsewhere to correspond with agricultural and horticultural societies, colleges and schools of agriculture and horticulture, and such other persons and bodies as may be directed by the Board, and prepare, as required by the Board, reports for publication.

Section 12. The Board shall, biennially, in the month of January, report to the Legislative Assembly a statement of its doings, with a copy of the treasurer's report for the two years preceding the session thereof. The members shall receive as compensation their actual expenses while engaged upon the work of the Board or the enforcement of the provisions of this act, and shall be allowed $3 a day for the time actually employed.

Section 13. The treasurer shall receive all moneys belonging to the Board and pay out the same only for bills approved by it, and shall render annually to the Board a statement in detail of all receipts and disbursements.

Section 14. There is hereby appropriated for the uses of the State Board of Horticulture, as set forth in this act, the sum of $4,500 for the year beginning January 1, 1895, and the sum of $4,500 for the year beginning January 1, 1896, out of any moneys in the State Treasury not otherwise appropriated, and the Secretary of State shall draw his warrant in favor of the treasurer of the Board for said sum upon the State Treasurer.

Section 15. That the fruit and horticultural interests of this State, being in urgent need of the protection afforded by this act, an emergency exists, and this act shall take effect from and after its approval by the Governor.

Approved February 23, 1895.

An act to amend an act entitled "An act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889, and an act amendatory thereof, entitled 'An act to amend an act entitled an act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889, approved February 21, 1891, and to protect the horticultural industry in Oregon, and an act amendatory thereof, entitled an act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889, and an act amendatory thereof, entitled an act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889,' approved February 21, 1891, and to protect the horticultural industry in Oregon," approved February 23, 1895.

Be it enacted by the Legislative Assembly of the State of Oregon:

Section 1. Section 1 of an act entitled "An act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889, and an act amendatory thereof, entitled an act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889,' approved February 21, 1891, and to protect the horticultural industry in Oregon," be and the same is hereby amended so as to read as follows:

Sec. 1. There is hereby created a Board of Horticulture, to consist of six members, who shall be appointed by a board, consisting of the Governor, Secretary of State, and State Treasurer. One member of said Board of Horticulture shall represent the State at large, and shall be the president and executive officer of the Board, and one member shall be appointed to represent each of the five districts, as hereby created, to-wit: (1) The First District, which shall comprise the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook; (2) the Second District, which shall comprise the counties of Marion, Polk, Benton, Lincoln, Linn, and Lane; (3) the Third District, which shall comprise the counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake; (4) the Fourth District, which shall comprise the counties of Wasco, Sherman, Morrow, Gilliam, and Crook; (5) the Fifth District, which shall comprise the counties of Umatilla, Union, Wallowa, Baker, Malheur, Harney, and Grant.

Section 2. Section 2 of an act entitled "An act to amend an act entitled 'An to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889,' and an act amendatory thereof, entitled 'An act to amend an act entitled an act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889,' approved February 21, 1891, and to protect the horticultural industry in Oregon," be and the same is hereby amended so as to read as follows:

Sec. 2. The members shall reside in the districts for which they are respectively appointed. They shall be selected with reference to their knowledge of and practical experience in horticulture and the industries connected therewith, and shall be engaged in practical horticulture during their incumbency of the office of commissioner. They shall hold office for the term of four years, and until their successors are appointed and have qualified, unless removed by the appointing board for failure to perform their duties. It shall be the duty of the president to visit at least once a year every district, and examine the orchards, nurseries, and work of the district commissioners, and ascertain whether or not the law and regulations of the Board are being properly executed. He must personally inspect most of the orchards during the fruit-growing season, see that the regulations of the Board regarding spraying are being faithfully executed wherever insects, pests or disease injurious to tree

Three-year-old Peach Tree; Orchard of R. H. Weber, The Dalles, Oregon.

or fruit are to be found. He must visit the principal fruit-shipping points during the shipping season, inspect the fruit shipped, and prevent the shipment of insect and pest-infested fruit. He shall give notice through the public press one week in advance of his visit to each county, giving the time and place of his visit, where he shall receive complaints of fruit growers, and distribute to them printed and oral instructions regarding destruction of pests, and other information, including proper methods of handling, packing and shipping fruits. It shall also be his duty to visit, when possible, if requested by an association or a number of fruit growers, the meetings of such associations of fruit growers, and aid them in the organization of proper associations beneficial to the growing and marketing of fruits. The president shall preside at all the meetings of the Board, and may call special meetings whenever an emergency may require it. He shall make an annual report to the appointing Board of the general condition of the fruit interests of the State and success of the commissioners in the work of exterminating pests and executing the law.

Section 15. Inasmuch as the provisions of this act are of immediate importance to the horticultural interests of this State, this law shall take effect from and after its approval by the Governor.

Approved February 17, 1899.

An act to protect the fruit and hop industry of Oregon.

Be it enacted by the Legislative Assembly of the State of Oregon:

Section 1. It shall hereafter be unlawful for any person, firm, or corporation, owning or operating any nursery, fruit orchard of any kind, hop yards, flower gardens, or ornamental trees, to throw any cuttings or prunings from any fruit trees, nursery stock, ornamental trees, or hop vines into any public road, highway, lane, field, or other inclosure, or into any water course of any kind; but shall destroy such cuttings or prunings with fire within thirty days from the time such cuttings or prunings are made.

Section 2. It shall hereafter be the duty of any person, firm, or corporation owning or operating any such nursery, fruit orchard, hop yard, flower garden, or ornamental trees, and knowing such to be infected with any kind of insects, pests, or disease, to immediately spray or destroy the same in such manner as the fruit commissioner for his district may direct.

Section 3. It shall be unlawful for any person, firm, or corporation doing business in the State of Oregon to sell paris green, arsenic, london purple, sulphur, or any spray material or compound for spraying purposes in quantities exceeding one pound without providing with each package sold a certificate, duly signed by the seller thereof, guaranteeing the quality and per cent of purity of said materials.

Section 4. Any person, firm, or corporation selling any of the above

materials which do not conform with the certificate furnished therewith, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not less than twenty-five ($25) dollars nor more than one hundred ($100) dollars.

Section 5. It shall be unlawful for any person, firm, or corporation to import or sell any infected or diseased fruit of any kind in the State of Oregon.

Section 6. Every person who packs or prepares for shipment to any point without the State, or who delivers or causes to be delivered to any express agent, or railroad agent, or other person, or to any transportation company or corporation for shipment to any point without the State, any fruit or fruits, either fresh, cured or dried, that is infected with insects, pests or diseases injurious to trees, shrubs, plants, fruits or vegetables, is guilty of a misdemeanor.

Section 7. Any person, firm, or corporation violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine of not less than twenty-five ($25) dollars nor more than one hundred ($100) dollars.

Section 8. It shall be the duty of the commissioner of the State Board of Horticulture of the district in which a violation of this act occurs to present the evidence of the case to the district attorney, whose duty it shall be to prosecute any person guilty of a violation of this act, which prosecution may be brought in any of the justice courts of this State.

Section 9. Inasmuch as the horticultural interests of this State demand immediate attention, this act shall be in full force and effect from and after its approval by the Governor.

Approved by the Governor.

An act to provide for the appointment of county fruit inspectors, and to amend sections 4178 and 4185 of the Codes and Statutes of Oregon, as compiled and annotated by Charles B. Bellinger and William W. Cotton.

Be it enacted by the People of the State of Oregon:

Section 1. That upon a petition of not less than twenty-five residents and fruit growers of any county in this State, the county court of said county shall appoint a county inspector, whose duty it shall be to inspect the apple and other fruit orchards of said county, and to enforce the laws now in force and that may be hereafter in force in this State, applicable to the fruit industry and to the growing, handling, and selling of fruit, fruit trees, and other nursery stock; *provided*, that the inspector so to be appointed shall be recommended and certified to be competent for such position by the State District Commissioner of the State Board of Horticulture for the said county, and said county inspector shall hold his office during the pleasure of said county court.

Section 2. It shall be the duty of the State District Commissioner to instruct and educate the county inspectors as to the laws and quarantine

regulations of this State, and the rules and regulations of the State Board of Horticulture. The county inspector shall perform his duties under the general supervision of the State District Commissioner for said county, to whom he shall make reports in the manner prescribed by the State Board of Horticulture.

Section 3. Such county inspector shall be paid for his services, by the said county, a sum not exceeding three dollars per day, and pay his own personal expenses, for each and every day actually employed in the performance of his duties as herein provided, and the said county inspector shall report monthly to the said State District Commissioner the time for which he is entitled to pay during the month next preceding, and the said State District Commissioner shall certify the same to the county court before such compensation shall be paid to said county inspector.

Section 4. If any county for any reason fails to appoint a county inspector as herein provided, then the inspector of any adjacent county may perform such services, and his compensation and the necessary expenses incurred in the performance of his duty shall be charged against the county where the service is performed, as if he had been appointed by the county court of said county.

Section 5. The State District Commissioner of Horticulture shall hear and promptly decide all appeals from the county inspector in his district, and his decision shall have full force and effect until set aside by the courts of the State. All appeals from county inspectors to the district commissioners shall be under the form and regulations as prescribed by the State Board of Horticulture.

Section 6. That section 4178 of the Codes and Statutes of Oregon, as compiled and annotated by C. B. Bellinger and William W. Cotton, be and the same is hereby amended to read as follows:

Sec. 4178. Said Board shall employ without their number a secretary, who shall exercise the powers and discharge the duties conferred upon him by this act, and whose compensation shall not exceed $100 per month, to be paid in the same manner as other State officers. Said Board shall also elect from their own number a treasurer. Before entering upon the discharge of his duties, each member of the Board shall make and subscribe an oath to support the Constitution of the United States and of the State of Oregon, and to diligently, faithfully, and impartially discharge the duties of his office, which said oaths shall be filed with the secretary. The secretary shall make and subscribe a like oath, which shall be filed with the treasurer of the Board.

Section 7. That section 4185 of the Codes and Statutes of Oregon, as compiled and annotated by C. B. Bellinger and William W. Cotton, be and the same is hereby amended to read as follows:

Sec. 4185. It shall be the duty of the several members of the Board and of the secretary or the county inspectors under their direction, whenever they shall deem it necessary, to cause an inspection to be made of any orchards, nurseries, trees, plants, vegetables, vines, or any fruit packing house, storeroom, salesroom, or any other place

within their districts, and if found infested with any pests, diseases, or fungous growth injurious to fruits, plants, vegetables, trees, or vines, or with their eggs or larvae liable to spread to other places or localities, or of such nature as to be a public danger, they shall notify the owner or owners or persons in charge of or in possession of such articles, things, or places that the same are so infested, and shall require said persons to eradicate or destroy said insects or pests, or their eggs or larvae, or to treat such contagious diseases within a certain time to be specified in said notice. Said notice may be served upon the person or persons, or any of them, owning, having charge, or having possession of such infested place, article, or thing, by any member of the Board or by the secretary thereof, or by any person deputed by said Board for that purpose, or they may be served in the same manner as a summons in an action at law. Such notice shall contain directions for the application of some treatment approved by the commissioners for the eradication or destruction of said pests, or the eggs or larvae thereof, or the treatment of contagious diseases or fungous growths. Any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruit, or articles thus infested are hereby declared to be a public nuisance; and whenever any such nuisance shall exist at any place in the State on the property of any owner or owners upon whom or upon the person in charge or possession of whose property notice has been served as aforesaid, and who shall have failed or refused to abate the same within the time specified in such notice, or in the property of any non-resident or any property not in the possession of any person and the owner or owners of which can not be found by the resident member of the Board or the secretary or county inspector after diligent search within the district, it shall be the duty of the Board or the member thereof in whose district the nuisance shall exist, or the secretary or county inspector under his or their directions, to cause such nuisance to be at once abated by eradicating or destroying said insects or pests or their eggs or larvae, or by treating or disinfecting or destroying the infested or diseased articles. The expense thereof shall be a county charge and the county court shall allow and pay the same out of the general fund of the county. Any and all sums so paid shall be and become a lien on the property and premises from which said nuisance shall have been removed or abated, in pursuance of this act, and may be recovered by a suit in equity against such property or premises, which suit to foreclose such liens shall be brought in the circuit court of the county where the premises are situate, by the district attorney in the name and for the benefit of the county making such payment or payments.

The proceedings in such cases shall be governed by the same rules, as far as may be applicable, as suits to foreclose mechanics' liens, and the property shall be sold under the order of the court and the proceeds applied in like manner. The Board is hereby invested with the power to cause such nuisance to be abated in a summary manner.

Filed in the office of the Secretary of State February 22, 1905.

QUARANTINE REGULATIONS.

At a special meeting of the Oregon State Board of Horticulture, held in Portland, April 2, 1895, all members present, the following regulations were adopted, in accordance with the laws regulating such matters, and are, therefore, binding upon all persons:

Rule 1—All consignees, agents, or other persons, shall, within twenty-four hours, notify the quarantine officer of the State Board of Horticulture, or a duly commissioned quarantine guardian, of the arrival of any trees, plants, buds, or scions at the quarantine station in the district of final destination.

Rule 2—All trees, plants, cuttings, grafts, buds, or scions imported or brought into the State from any foreign country, or from any of the States or Territories, are hereby required to be inspected upon arrival at the quarantine station in the district of final destination; and if such nursery stock, trees, plants, cuttings, grafts, buds, or scions are found to be free of insect pests and fungous diseases, the said quarantine officer or duly commissioned quarantine guardian shall issue a certificate to that effect; and, furthermore, if any of said trees, plants, cuttings, grafts, buds, or scions are found infected with insect pests, fungi, blight, or other diseases injurious to fruit or to fruit trees, or other trees or plants, they shall be disinfected and remain in quarantine until the quarantine officer of the State Board of Horticulture or the duly commissioned quarantine guardian can determine whether the said trees, plants, cuttings, grafts, buds, or scions are free from live, injurious insect pests or their eggs, larvae or pupae or fungous diseases before they can be offered for sale, gift, distribution, or transportation. All persons or companies are hereby prohibited from carrying any trees, plants, cuttings, grafts, buds, or scions from without the State to any point within the State beyond the nearest point on its line or course to the quarantine station in the district of ultimate destination; or from any point within the State to any point therein, until such trees, plants, cuttings, grafts, buds, or scions have been duly inspected, and, if required, disinfected as hereinbefore provided; and all such shipments must be accompanied by the proper certificate of the inspecting officer; *provided, however*, that after such persons or company have given the proper officer four days' notice, he or they shall not be required to hold such shipments further, without directions from such officer.

Rule 3—All peach, nectarine, apricot, plum, or almond trees, and all other trees budded or grafted upon peach stocks or roots, all peach or other pits, and all peach, nectarine, apricot, plum, or almond cuttings, buds, or scions, raised or grown in a district where the "peach yellows" or the "peach rosette" are known to exist, are hereby prohibited from

being imported into or planted or offered for sale, gift, or distribution within the State of Oregon.

Rule 4—All trees, plants, cuttings, grafts, buds, scions, seeds, or pits arriving from any foreign country found infected with insect pests or their eggs, larvae, or pupae, or with fungi, or other disease or diseases hitherto unknown in this State, are hereby prohibited from landing.

Rule 5—Fruit of any kind grown in any foreign country, or in any of the States or Territories, found infected with any insect or insects, or with any fungi, blight, or other disease or diseases injurious to fruit or fruit trees, or to other trees or plants, is hereby prohibited from being offered for sale, gift or distribution within the State.

Rule 6—Any boxes, packages, packing material, and the like, infected with insect or insects, or their eggs, larvae or pupae, or by any fungi, blight, or other disease or diseases known to be injurious to fruit or to fruit trees, or to other trees or plants, and liable to spread contagion, are hereby prohibited from being offered for sale, gift, distribution, or transportation until said material has been disinfected by dipping it in boiling water and allowing it to remain in said boiling water not less than two minutes; such boiling water used as such disinfectant to contain, in solution, one pound of concentrated potash to each and every ten gallons of water.

Rule 7—All trees, plants, grafts, cuttings, buds, or scions may be disinfected by dipping in a solution of three-fourths of a pound of whale-oil soap (80 per cent) to each and every gallon of water; said whale-oil soap solution shall be kept at a temperature of 100 to 150 degrees. Said trees, plants, cuttings, grafts, buds, or scions shall remain in said solution not less than two minutes. After said trees, plants, cuttings, grafts, buds, or scions have been disinfected, they shall remain in quarantine fourteen days, unless otherwise directed by the inspecting officer, for subsequent inspection, and if deemed necessary by the quarantine officer of the State Board of Horticulture, or a duly commissioned quarantine guardian, for further disinfection.

Rule 8—All trees, plants, cuttings, grafts, buds, or scions may be disinfected by fumigation with hydrocyanic acid gas, as follows: Said trees, plants, cuttings, grafts, buds, or scions shall be covered with an air-tight tent or box, and for each and every 100 cubic feet of space therein one ounce of (C. P.) cyanide of potassium (98 per cent), one fluid ounce of sulphuric acid, and two fluid ounces of water shall be used. The cyanide of potassium shall be placed in an earthenware vessel, the water poured over the said cyanide of potassium, afterward adding the sulphuric acid, and the tent or box to be immediately closed tightly, and allowed to remain closed for not less than forty minutes. After said trees, plants, cuttings, grafts, or scions have been treated with hydrocyanic acid gas as above directed, they shall remain in quarantine for fourteen days, unless otherwise directed by the inspecting officer, for subsequent inspection, and if deemed necessary by a member of the State Board of Horticulture, or the quarantine officer of said

Board, or a duly commissioned quarantine guardian, for subsequent disinfection.

Rule 9—All trees, plants, cuttings, grafts, buds, or scions imported or brought into the State shall be inspected upon arrival at the quarantine station in the district of final destination, and if found infected with any injurious insects or diseases which can not be destroyed by the remedies required in rules 7 and 8 of these regulations, are hereby prohibited from being planted or offered for sale, gift, or distribution, and shall be proceeded against as a nuisance.

Rule 10—If any person or persons having in their possession trees, plants, cuttings, grafts, buds, scions, seeds, or pits infected with an insect or insects, or with any fungi, blight or other disease or diseases injurious to fruit trees, or to any other trees or plants, shall refuse or neglect to disinfect the said trees, plants, cuttings, grafts, buds, scions, seeds, or pits as is required by rules 7 and 8 of these regulations, after having been notified to do so by a member of the State Board of Horticulture, the quarantine officer of said Board, or a duly commissioned quarantine guardian, the said trees, plants, cuttings, grafts, buds, scions, seeds, or pits shall be declared a public nuisance, and shall be proceeded against as provided by law.

Rule 11—Animals known as flying fox, Australian or English wild rabbits, or other animals or birds detrimental to fruit or fruit trees, plants, etc., are prohibited from being brought or landed in this State, and, if landed, shall be destroyed.

Rule 12—Quarantine stations: For the First District, comprising the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook, shall be Portland. W. K. Newell, quarantine officer, or any member of the Board or the secretary thereof. For the Second District, comprising the counties of Marion, Polk, Benton, Linn, Lincoln, and Lane, shall be Salem. L. T. Reynolds, quarantine officer, or any member of the Board or the secretary thereof. For the Third District, comprising the counties of Josephine, Coos, Curry, Douglas, Jackson, Lake, and Klamath, shall be Ashland. A. H. Carson, quarantine officer, or any member of the Board or the secretary thereof. For the Fourth District, comprising the counties of Morrow, Wasco, Gilliam, Crook, and Sherman, shall be The Dalles. Emile Schanno, quarantine officer, or any member of the Board or the secretary thereof. For the Fifth District, comprising the counties of Umatilla, Union, Baker, Wallowa, Malheur, Grant, and Harney, shall be Milton and Pendleton. Judd Geer, quarantine officer, or any member of the Board or the secretary thereof. At all stations such other quarantine officers as may be from time to time appointed by the Board, notice whereof will be given, and complete lists of whom may be obtained from the secretary or any member of the Board.

Rule 13—Importers or owners of nursery stock, trees or cuttings, grafts, buds, or scions, desiring to have such nursery stock, trees, plants, cuttings, grafts, buds, or scions inspected at points other than regular quarantine stations, may have such inspection done where required;

provided, however, that such importers shall pay all charges of inspection; such charges and expenses to be paid before a certificate is granted. Transportation companies or persons and consignees or agents shall deliver and cause to be detained all nursery stock, trees, plants, and fruit at one or the other of the quarantine stations, for inspection, as provided by the rules and regulations of the Board.

Rule 14—The fee for the inspection of apple, pear, plum, peach, nectarine, prune, cherry, apricot, nut-bearing trees, and all other trees, shrubs, or plants, shall be as follows: Thirty cents per hour, including the time from leaving home, inspection and return home of the inspector, and actual traveling and other expenses. On all fruits the fee for inspection shall be $1 on any sum up to $35, and $2 on any sum over that amount, and $5 for carload lots.

Rule 15—All persons growing nursery stock, trees, and plants for sale, or to be offered for sale, are hereby required to report to the commissioner of the district in which said nursery stock, trees, or plants are grown, for inspection during the months of September, October, or November of each and every year and the commissioner of such district, or his duly appointed deputy, shall inspect such nursery stock, trees, or plants prior to shipment and delivery. When said nursery stock, trees, or plants are found by said inspecting officer to be worthy of a certificate setting forth the freedom of such nursery stock, trees, or plants, from live, injurious insect pests, their eggs, larvae, pupae, or fungous disease, the said inspecting officer shall then issue to the owner or owners of said nursery stock, trees, or plants, a certificate of inspection. The condition under which this certificate is granted is, that the party or parties receiving such certificate shall be compelled to disinfect by fumigation with hydrocyanic acid gas, as described in rule 8, all pear and apple trees, or other stock grown on apple roots, after lifting the same and before delivery to purchaser or carriers; and, in case such fumigation is neglected, said certificate of inspection shall be void and of no effect.

Passed at a meeting of the State Board of Horticulture at Portland, Oregon, April 3, 1895, and amended at a regular meeting of the State Board of Horticulture at Salem, Oregon, October 15, A. D. 1895.

At a meeting of the State Board of Horticulture of the State of Oregon, held October 8, 1906, Rule 8 of the Quarantine Regulations of the State Board of Horticulture passed at a meeting of the State Board of Horticulture April 3, 1895, and amended October 15, 1895, is hereby annulled and void and the following rule substituted, to-wit:

All trees, plants, grafts, buds, or scions grown in the State of Oregon and offered for sale within the State, and all trees, plants, grafts, buds, or scions grown out of the State of Oregon and sold within the State for planting and propagation shall be dipped in a standard solulution of lime, sulphur and salt by the consignor of the same, on or before delivery of the same to the consignee.

Peach Orchard of R. H. Weber, The Dalles, Oregon.

THE FIRST FRUITS OF THE LAND.

A BRIEF HISTORY OF EARLY HORTICULTURE IN OREGON.

By DR. J. R. CARDWELL, Portland.

For many years president of the Oregon State Horticultural Society.

The first settlers found here in the indigenous fruits, a promise of the abundant yield of the cultivated varieties which they were not long in introducing with most gratifying results. There were here the apple—*Pyrus rivularis;* the plum—*Prunus subcordata;* the grape—*Vitis Californica;* two elderberries—*Sambucus glauca* and *Sambucus callicarpa;* the blackberry—*Rubus ursinus;* five raspberries—*Rubus parviflorus, Rubus lencodermis, Rubus strigosus, Rubus pedatus,* and *Rubus spectabilis;* the strawberry—*Fragaria Chiloensis;* several wild currants—*Ribes aurenm,* and others; three gooseberries, edible—*Ribes Menzicsii;* four or more huckleberries—*Vaccinium Caespstosnm, Vaccinium ovalifolium, Vaccinium macrophyllum, Vaccinium ovatum;* the barberry—*Berberis Aquifolium,* known as the Oregon grape, our State flower; salal—*Gaultheria• shallon;* Juneberry or service berry—*Amalanchier florida;* black haw—*Crataegus brevispina;* filbert—*Corylus Californica;* chinquapin chesnut—*Castanopsis chrysophylla,* and others perhaps not enumerated.

The introduction of the first cultivated fruits in the country in 1824 by employees of the Hudson Bay Company is a pretty story with a touch of romance. At a dinner given in London, in 1824, to several young men in the employ of the Hudson Bay Company bound for the far distant Pacific Coast, a young lady at a table, beside one of the young gentlemen, ate an apple, carefully wrapped the seeds in a paper and placed them in the vest pocket of the young gentleman, with the request that when he arrived in the Oregon Country he should plant them and grow apple trees. The act was noticed and in a spirit of merriment other ladies present, from the fruits of the table, put seeds of apple, pears, peach, and grape into the vest pockets of all the gentlemen. On their arrival at the Hudson Bay Fort at Vancouver the young gentlemen gave the seeds to the company's gardener, James Bruce, who planted them in the spring of 1825. From these seeds came the trees now growing on the grounds of the Vancouver Barracks, as transferred to the Government on the disbanding the company. This story we have from David McLoughlin, the son of Dr. John McLoughlin, Mrs. McLoughlin, Mrs. Whitman, in part, and others.

Mrs. Whitman, in September, 1836, in a letter to her mother, writes of her visit to Vancouver, and her admiration of these fruit trees and their fruits as follows: "On arriving at Vancouver we were met by

several gentlemen who came to give us a welcome: Mr. Douglas and Doctor Tolmie and Doctor McLoughlin of the Hudson Bay Company, who invited us in and seated us on a sofa. Soon we were introduced to Mrs. McLoughlin and Mrs. Tolmie, both natives of the country, half-breeds; after chatting a little we were invited to take a walk in the garden. What a delightful place it is, what a contrast to the rough, barren plains through which we had so recently passed; here we find fruits of every description, apples, grapes, pears, plums, and fig trees in abundance; also cucumbers, melons, beans, peas, beets, cabbage, tomatoes, and every kind of vegetable. Every part is very neat and tastefully arranged with fine walks lined on either side with strawberries; at the end of the garden is a summer house with grapevines."

The apple and the pear trees, and the grapevines from these seeds are yet annually bearing fruits on the grounds of the Government barracks at Vancouver. Not long ago I visited these seedling trees, now eighty years old, hoary chroniclers of time, yet showing a vigorous growth. Mrs. Gay Hayden, of Vancouver, informed me she had eaten fruit from these trees for fifty-four years. The fruit is not large, but of fair quality. Fortunately Government does not allow a tree to be removed or destroyed without an order from the department. Captain Nathaniel Wyeth, in his diary of 1835, speaks of having grafted trees on his place, Fort William, on Wapatoo Island, now called Sauvie's Island. Grafts and stock must have come from the Sandwich Islands, then the nearest point to the cultivated fruits which early missionaries had brought to these islands. As Captain Wyeth left the country soon after, we have no record of his success with these fruits. As Indians and trappers had little care for trees or cultivated fruits, this venture can not be considered in any historical record of the introduction of grafted fruit in Oregon.

The Hudson Bay Company introduced the first cultivated rose, as early as 1830, a pink rose, with the attar of rose aroma. An occasional Hudson Bay rose may yet be seen in the old yards in Oregon City and at Vancouver. It is sometimes called the Mission rose. Miss Ella Talbot, on Talbot Hill, just south of Portland Heights, has one more than forty years old. The Biddle rose—the Chinese daily—1852, probably the second importation. The Gillette rose, 1853, the third and most valuable, is now widely distributed. The cut-leaved Evergreen blackberry (*Rubus laciniatus*) came from the Sandwich Islands. I first saw it early in the fifties, covering a thirty-foot trellis in the dooryard of J. B. Stevens—"Uncle Jimmie Stevens," as he was known. From him I learned that it came from the Sandwich Islands, reported to be a native of one of the South Sea islands. One of the Feejee islands is covered with it. Seth Lewelling originated the Lewelling, the Black Republican, and the Bing cherries, in the sixties. The Bing was named after a faithful old Chinaman. He also originated the Golden prune in 1876. The Silver prune was a misnomer of Coe's Golden Drop, perpetrated by a nurseryman about 1875. The Lambert cherry

was grown by J. H. Lambert and presented by him to the Oregon State Horticultural Society at the annual meeting of 1896. The Bremen prune, the Imperial Precose, the Ickwort plum, Reine-Claude, Vert, and the favorite French table plum, the Mirabel, were in my importations from Germany in 1872. The Bullock prunes were seedlings of the seventies grown by Mr. Bullock near Oswego. A. R. Shipley, some time in the sixties, imported from the Eastern States forty-five varieties of grapes, American and European varieties. For some years he grew quite a vineyard, was an enthusiast in grape culture—a business man retired to the country for love of horticulture. A close observer and a good cultivator, he did valuable work for the grape industry, and was the acknowledged authority on the subject. He discarded all European varieties, and advised the cultivation of only the American varieties for the Willamette Valley. In answer to my request to name the three best varieties for the market, he said: "If I were setting out three hundred grapes today, I would first set one hundred Concords, then another one hundred Concords, then another one hundred Concords," adding, "that is, to make money."

In early days we had agricultural literature. The first paper was the *Oregon Farmer*, August, 1858, published at Portland by W. B. Taylor & Co., Albert G. Walling, editor. A file of that paper in the rooms of the Oregon Historical Society reads well today. It was published from 1858 to 1863. Then came the *Oregon Agriculturist*, Salem, 1870 to 1872, by A. L. Stinson. E. M. Waite published a paper for a time in Salem. The *North Pacific Rural Spirit*, W. W. Baker, publisher and editor, Portland, started in 1867, is now published and edited by M. D. Wisdom. To-day we have the *Rural Spirit*, Portland, *Pacific Homestead*, Salem, and *Oregon Agriculturist and Rural Northwest, Portland*, published and edited by H. M. Williamson, and the *Northwest Pacific Farmer*, Portland, published and edited by Frank Lee.

The early history of fruit growing presents to the student at once, a most romantic and a thoroughly practical and matter-of-fact series of interesting pictures. It is related of some of the earliest settlers in the Willamette Valley that nothing more thoroughly and painfully accentuated their isolated condition than the absence of fruit trees on their newly-made farms. Half the beauty and pleasure that brightens the life of youth and childhood, it is not too much to say, is found in the orchard of the old homestead—the sight of the trees in bloom, the waiting and watching for the first ripe fruit, the in-gathering of the fruit in the fall, and the storing of it away in bin and cellar for use in the winter around the ingleside.

Is it any wonder, then, that when some of the early settlers were called to Southern Oregon to aid their fellow countrymen in repelling the attacks of Indians, and finding there wild plums and wild grapes, they brought with them on their return, roots of the former and cuttings of the latter, in the hope that these foundlings of the southern forest would take kindly to a more northern soil? In this act of transplanting was illustrated the world's hunger for the fruit of the vine and tree, so

beautifully illustrated by Whittier in his poem commencing with these lines:

"The wild grape by the river side
And tasteless ground-nut trailing low,
The table of the woods supplied."

The old Puritans could not have been such terribly stern and uncompromising foes of the good things of life, after all, since they knew enough to find gustatory delight in such fruits as kind Mother Nature provided for them in their exile.

Fruit culture is most fascinating and ennobling, as well as the most profitable branch of horticulture, and the advance in the fruit product is evidence of the culture and civilization of a people. It is hard to over-estimate the beneficial influence on health, morals, and manners of a generous fruit supply. The ornamental grounds and orchards of the homestead do much in childhood to strengthen that love of home and pride of family which is the foundation of all patriotism. The cherished memories of home thus enriched are, in after life, the strongest bond of family to bring back the absent and wandering to the roof tree; and the erring one is not wholly lost as long as these sacred memories of home and childhood sometimes come to swell the heart and dim the eye with the tear of repentance and contrition.

The fruit industry as a business, in its variety, extent, and commercial importance, as we find it to-day, is of recent origin and within the memory of the present generation—a worthy tribute to the brain and muscle of men of our time. National and international communication over water and land, the use of railroads with cheap freight rates and rapid transit in fruit and refrigerator cars created the supply; conversely the supply increased creates the greatest demand—an inexorable law of trade. The intelligent foresight and patient labors of those who inaugurated this industry in the far-off wilds of Oregon, are worthy a place in the archives of the State, and should be kept green in the memory of those to come after us.

In the summer of 1847, Mr. Henderson Luelling,* of Iowa, brought across the plains several hundred yearling grafted sprouts—apple, pear,

*It will be noticed that there is a difference in the spelling of the names of Henderson Luelling and Seth Lewelling. As they were brothers this discrepancy may seem to suggest an error in one case or the other. The explanation is this, it being given me by Alfred Luelling, a son of Henderson, a few years ago: The family, originally, came from Wales, and in the latter part of the eighteenth century settled in North Carolina. Soon after arriving the head of the family decided to change the name from the usual Welsh style of writing it—Llewellyn to Luelling, in order to simplify it as much as possible. This was the practice of the family when the children were born—Henderson on April 23, 1809, and Seth several years later. During his whole life Henderson followed the spelling adopted by his father; and that was the custom of Seth until late in life—at least as late as 1875—as is shown by his nursery catalogues which I printed. Soon after the latter year he adopted "Lewelling" as his mode of spelling the name, but "Luelling" was the style retained by the remainder of the family.—GEORGE H. HIMES.

cherry, plum, prune, peach, grape, and berries—a full assortment of all the fruits grown in the then far West. These were placed in soil in two large boxes, made to fit into a wagon bed, and carefully watered and tended on the long and hazardous six-months journey with an ox team, thousands of miles, to the banks of the Willamette just north of the little townsite of Milwaukie, Clackamas County.

Here a little patch in the dense fir forest was cleared away with great labor and expense, and the first Oregon orchard was set that autumn with portent more significant for the luxury and civilization of this country than any laden ship that ever entered the mouth of the Columbia. A fellow traveler, William Meek, had also brought a sack of apple seed and a few grafted trees; a partnership was formed and the firm of Luelling & Meek started the first nursery in 1848. Roots from seedling apples planted at Oregon City and on French Prairie, and sprouts from the wild cherry of the vicinity, and wild plum roots brought in from Rogue River Valley, furnished the first stock. And it is related that one root graft in the nursery the first year bore a big red apple, and so great was the fame of it, and such the curiosity of the people, that men, women, and children came from miles around to see it, and made a hard beaten track through the nursery to this joyous reminder of the old homestead so far away.

Ralph C. Geer also came in 1847 and brought one bushel of apple seeds and half a bushel of pear seeds, and was one of the first to plant an orchard in the Waldo Hills.

People in those days in this sparsely settled country knew what their neighbors were doing, and in the fall of 1848 and spring of 1849, they came hundreds of miles from all over the country for scions and young trees to set in the little dooryard or to start an orchard; so that the trees were soon distributed all over the settlements of the valley—yearlings selling at 50 cents to $1 each.

The first considerable orchards were set on French Prairie, and in the Waldo Hills, and about Salem. Of apples the following varieties were common: Red Astrachan, Red June, Talman's Sweet, Summer Sweet, Gravenstein, White Winter Pearmain, Blue Pearmain, Genet, Gloria Mundi, Baldwin, Rambo, Winesap, Jennetting, Seek-no-further, Tulpahocken, American Pippin, Red Cheek Pippin, Rhode Island Greening, Virginia Greening, Little Romanite, Spitzenberg, Swaar, Waxen, and a spurious Yellow Newtown Pippin since called Green Newtown Pippin—a worthless variety which has since caused much trouble to nurserymen, orchardists, and fruit buyers, and brought by mistake for the genuine—and other varieties not now remembered.

Of pears, the Fall Butter, Pound Pear, Winter Nelis, Seckle, Bartlett, and others.

Of cherries, May Duke, Governor Wood, Oxheart, Blackheart, Black Tartarian, Kentish, and others.

Peaches, the Crawford, Hale's Early, Indian Peach, Golden Cling, and seedlings.

Of plums, the Gages, Jefferson, Washington, Columbia, Peach Plum, Reine Claude, and Coe's Late Red were leading varieties.

Of prunes there was only one variety, our little German prune, a native of the Rhine, sometimes called the Rhine Prune, and from which our Italian is a lineal descendant—a sport from its native country.

The grapes were the Catawba and Isabella.

The climate was propitious, and the soil fertile, and there were no insect pests. Trees grew rapidly and they were prolific of such fruit as had never been seen before.

About 1850, a Mr. Ladd started a nursery near Butteville, and in the same year Mr. George Settlemier arrived by way of California with a good supply of fruit-tree seed, which he planted on Green Point, and afterwards removed to his present home at Mt. Angel, where, as fast as his limited means would allow, a large stock of fruit and ornamental trees were accumulated, making in all the largest variety in the Territory. Mr. Settlemier wisely interested his large family of sons in the business by giving them little blocks of ground for side nurseries of their own. J. H. Settlemier tells, with pride, how he started, at ten years of age, in three fence corners, and at thirteen had one thousand trees and sold one bill of $60.

Another nursery was started near Salem and the pioneer fruit industry was fairly inaugurated. This year Mr. Luelling went back East and selected from the extensive nurseries of Ellwanger and Barry, and A. J. Downing, a large variety of young trees and plants, which he brought back via the Isthmus of Panama, carried across by Indians and mules. This time Mr. Luelling, to correct his mistake in the Yellow Newtown Pippin, had Mr. Downing personally point out the trees as they were dug. Strangely the same mistake occurred again, and again Luelling brought out the Green Newtown Pippin, and it was not for some years that the real Yellow Newtown Pippin was introduced into Oregon. The first box of apples placed upon the sidewalk in Portland, by Mr. Luelling, was eagerly purchased by the admiring fruit-hungry crowd that gathered about, at $1 per apple, and returned the neat little profit of $75.

The home market now showed many of the above mentioned fruits, which were eagerly sought at fabulous prices. Apples brought as high as $1 per pound by the box, and in Portland retailed at $1.50 per pound readily, and all other fruits nearly as much.

Californians, fruit hungry, with plethoric purses, bid high for the surplus, and in 1853, a few boxes, securely bound with strap iron (as was the custom in those days for protection against fruit thieves), were shipped to San Francisco and sold for $2 per pound.

In 1854 five hundred bushels of apples were shipped, and returned a net profit of from $1.50 to $2 per pound. In 1855 6,000 bushels were shipped, and returned $20 to $30 per bushel. Young trees were now in full bearing and the export of 1856 was 20,000 boxes. This year one box of Esopus Spitzenberg paid the shipper a net profit of $60, and

three boxes of Winesap were sold in Portland at $102. From this time to 1869 the fall and winter shipments bimonthly to San Francisco, per steamer, were from three thousand to six thousand boxes.

In those days the foundation for many a princely fortune was laid, and to-day many of our fellow citizens are enjoying the merited reward of their enterprise in a luxurious competence and the "glorious privilege of being independent." But California with her proverbial enterprise, took in the situation and imported across the Isthmus of Panama thousands of young trees and root grafts, which multiplied into millions, and orchards, which had been set out all over the fertile valleys and hillsides, were now coming into bearing; thus her local market was supplied because she was an exporter.

The business decreased from 1860 until 1870. Only a few boxes per steamer of the late winter varieties were sent. These were the Yellow Newtown Pippin, Winesap, Red Cheek Pippin, Genet, and Red Romanite, which, grown in our cooler climate, kept until the California varieties were gone. This marks the decadence of the fruit industry in Oregon. California sent us apples, pears, cherries, plums, prunes, apricots, grapes, and berries a month or two earlier than we could produce them; and with them came many of the insect pests which she had imported from Australia and the Eastern States, which hitherto had been unknown to us. In our isolation we had no outlet by rail or water for our surplus products. Transportation, such as we had, was enormously expensive. We could not even ship dried fruits. Our elegant orchards were neglected and the fruit allowed to fall to the ground and decay, thus furnishing breeding grounds for the green and woolly "aphis" and the "codling moth."

To recapitulate: The establishment of orchards in California; the fall of prices to something like a normal standard; over-production, perhaps, on our part—at any rate the lack of demand at remunerative prices for the fruits peculiar to this section—led to carelessness on the part of growers, neglect of the most ordinary precautions, inattention and wastefulness, which resulted not only in spontaneous breeding of insect pests, but also to such conditions of ground and trees that made them favorable to the immeasurably rapid propagation of them, when the establishment of communication with infected points made their introduction not only possible but certain. The natural result of this much-to-be-deplored condition of affairs is too well known to need elaboration. In this respect we were confronted with a condition, not a theory; and while leaving this condition an open subject for further reference before concluding, I pass on to a new era—premising that the establishment of one, two, and three transcontinental railways, the rapidly growing population of the Northwest extending back to the valley of the Mississippi, the limited fruit area for the few hardy varieties, present conditions to which we must now adjust ourselves.

The Department of the Interior, recognizing the fact that the vast "waste places" of the great Northwest, destined to be the homes of

thousands upon thousands of hardy and adventurous home-builders, would be found unsuitable for the propagation of our fruits, ordered the importation of apples and other fruits acclimated to the regions of Russia and Siberia and arranged for the establishment of experiment stations to plant and test these trees in the cold, desolate regions north of us. Prof. J. L. Budd, of the Iowa Agricultural College, and Mr. Charles Gibb traveled through Russia and made a very full collection, consisting of hundreds of varieties of wild and cultivated fruits. These were distributed widely over the Northwest and were also tested by Professor Budd on the college grounds. All experiments, practically, have proven failures. To give some idea of the result of these experiments, and the present status of "orcharding" in the West and Northwest, I quote from an article in the November *American Garden*, from the pen of Prof. J. L. Budd:

The summers and winters during the past six years have been the most trying known to the history of the West on orchard fruits. So far as I know, the wreck of western orchards had known no parallel in the world's history. On the college grounds, the old orchard of 1,200 trees, planted prior to our experimental work with Russian fruits, was totally wrecked, and is now a clover field. Of the 118 varieties, the hardiest of the old list, the Duchess, Whitney's No. 20, and Tetofsky were the only really sound trees left when the orchard was grubbed out. In like manner our pear, European plum, and cherry, of the old list have been destroyed and the stubs dug out. Over a large part of the State east of the Missouri divide, this orchard wrecking has been as complete as with us.

In those snowy and ice-bound regions before referred to will in a few years be found vast aggregations of people. Let the experiments of planting acclimated fruits be ever so successful, all that can be grown either for ornament of their bleak homes, or for the supply of the local markets will be but a fraction, and an insignificant one at that, of the amount required.

But to follow up the line of thought from the virtual blight and vital paralysis of this industry in our own borders, to illustrate the spirit of the times, California now leading off, had gathered enormous crops from her immensely large orchards. The problems of rapid transit, safe packing for long distances, transportation and reasonable freight rates, had not received the attention they deserved from orchardists and railroad men. Things were in a chaotic state. The facilities for canning were entirely inadequate. The fruit could not be handled, and thousands of tons were left to rot, or taken to an unremunerative market, and dumped into San Francisco Bay. There was a flurry among fruit growers; outspoken, indeed clamorous expressions of alarm were heard on all sides. The timid prophesied wreck, ruin, and disaster. Newly planted orchards were given over to neglect; large tracts set aside for tree planting were left to native pasturage, or sown to wheat, oats, clover or grass. A vast, important, and promising industry was in great jeopardy. The press of the Golden State, the common

GIFFORD Foto

carriers, the far-sighted men who saw what the possibilities were in this direction, came to the rescue with well-considered presentations of the true facts in the premises. They discussed the subject at issue in the light of well-established and fully-recognized business principles.

The geographical position of the country, its peculiar climatic surroundings, its adaptability to the production of certain fruits, and the lack of similar climatic conditions in vast areas certain to be the homes of vast populations, were pointed out and dwelt upon, and the certainty that these vast populations in the nature of things, would require immense supplies of our fruits, green, dried, canned, and preserved, was made apparent. This view of the case struck the country press forcibly. It was restated, reiterated, and continuously kept before the people with results, which, in their magnitude and importance, can only be hinted at in this article. But, much that was said, and all there was to say, applied as well to Oregon, and our practical thinking men took up the subject. The scare was over—the spirit was contagious. Old orchards were trimmed and cultivated and new ones set. All the fruits of the temperate zone, so far as tried, had done well in Oregon. Our Italian prunes, Bartlett pears, and Royal Ann and Black Republican cherries paid best, and were attracting favorable attention abroad. The last few years trees of these varieties had been set out by hundreds of thousands all over the State, but mostly through the Willamette Valley. The trees when properly cared for make a vigorous, healthy growth; and five years from the setting make pecuniary returns.

As these to-day are our leading varieties and of considerable importance and great promise in the future commercially, they seem to deserve some historical record. The prune, as before stated, was introduced in 1847 by Henderson Luelling, of Iowa. Our little German prune—Luelling prune—is the true German prune, a native of the Rhine, propagated from the seed, and cultivated more extensively in Germany and over the continent of Europe than any other fruit, and is the "butter" and the condiment of the peasantry and a principal source of revenue. The prune has always done well with us.

In 1857 Mr. Henry Miller, of the firm of Miller & Lambert, of Milwaukie, who had purchased the orchard of Luelling & Meek, sent to Ellwanger & Barry, of Rochester, N. Y., for the best drying prunes; and in answer received scions of the Italian (Fellenburg), and a little oblong purple prune called the d'Agen, but not the prune grown now as Petite d'Agen or French prune. These scions were worked on bearing plum trees, and soon bore heavy crops. The d'Agen, though a sweet, palatable prune, when green proved to be a poor shipper and watery and unsuitable for drying; so, after being pretty extensively tested over the State, was abandoned. The Italian was a large palatable fruit, a good shipper, and yielded 33 per cent when dried; making a showy black prune—excellent as a "confection" to eat out of hand; requiring little sugar and of the finest flavor when cooked. The tree is free from all pests, stocky and vigorous; is a regular bearer, carrying its fruits

well distributed, and requiring no thinning; remarkable in the respect that it sheds all fruit it can not perfect to a good large size according to the dryness of the season. The tree responds to good treatment but does tolerably in the grass plot and under neglect, and has been called "the poor, shiftless man's tree."

About the year 1858 Mr. Seth Lewelling, a brother of Henderson Luelling, set the first Italian prune orchard, five acres, near Milwaukie. Others, noting the elegance of the fruit, in quality, size, and flavor, and its fine shipping and drying qualities, began setting trees in different localities over the State for home use, and as an experiment to test locality, and as a basis for business calculation. About 1870 there was much talk and speculation about prunes and prune growing as a business, for and against, those favoring showing facts and figures, those against claiming that our prunes were not the true German and Italian prunes, and that the prune in this country would, as they had in Eastern States, degenerate into a worthless, watery plum not fit for drying, and, at any rate, that the curculio would soon come and destroy them. Solid business men considered the prune business a visionary scheme, not worthy a serious consideration.

To verify our plums and prunes, in 1872, I ordered from August Bauman, of Bolwiler on the Rhine, one of the largest and most reliable nurserymen in Germany, scions of fourteen varieties of plums and prunes. These came by express at a cost of $11 per package. After five orders and five packages in various shapes had been received in worthless condition, the sixth package enveloped in oil silk and hermetically sealed in a tin can, came in good order. These were grafted on bearing trees, and the third year bore fruit. The Italian prune, German prune, the Petite d'Agen, Coe's Golden Drop, and all other varieties—just such fruit as we had been growing for these varieties—thus settling the matter of varieties beyond dispute. Whereupon, from 1871 to 1881, I set eighty acres to orchard near Portland; six thousand prunes and plums, one thousand Royal Ann and Black Republican cherries, fifteen hundred Bartlett pears, five hundred Winter Nelis, and other pears and winter apples.

This, I am told, was the first commercial prune orchard on the coast. In 1876 I built a three-ton box drier, dried several tons of pitted peach plums, sold at 16 cents per pound in fifty-pound boxes. The first yield of prunes dried in 1876 brought 12 cents, and for some years did not drop below 9 cents.

It was in August, 1853, in the then little village of Portland, we met our first surprise in the fruit product of Oregon. A small basket of peach plums had attracted a crowd of fruit-hungry admirers. They were handed out, five for a quarter, the smallest change offered or accepted in pioneer days.

To-day you can not understand the sensation of this occasion, or how, later, the first boxes of Italian prunes on a country wagon collected a crowd of merchants, clerks, and street people to the marketing, and how

voraciously they were eaten out of hand on the spot. The price, though extravagant, was not considered. You can not understand, for you were never young a thousand miles away from home, in a new country, isolated, without transportation, and without fruit. The peach-plums referred to were highly colored, large, and beautiful, as we know them in Oregon, but then they looked much larger and more beautiful, the aroma was most apetizing, and the melting, juicy pulp of the ripened fruit was enjoyed with a keen gustatory satisfaction.

In our distant home in the West, then as far out as Illinois, we only knew the little wild, red plum, stung by the curculio, and wormy. We boys ate them at the risk of the worms, which we no doubt often ate with the plum. The cultivated domestic plum had not been introduced; we had never seen it, scarcely heard of it, hence the surprise.

Citizen P. W. Gillette was then a nurseryman, near Astoria, and had imported from his father's nursery in Ohio a fine stock of fruits and ornamentals. It was in 1855 I made my first considerable order, and I have been ordering and setting trees ever since, as I have been told I "had the tree-setting craze, and had it bad." In the sober reflections of the present I must acknowledge it was true. I had to set trees. For many years I cleared our heavy timber land, and set out ten acres a year. Moderately speaking, I have set over two hundred acres in trees —not a large orchard now. The time had not come for the large commercial orchards of to-day.

I was not alone; the mania was infectious; seemingly nearly everybody was setting fruit trees and plums; the front yards and the back yards of the towns had them. Shrewd business men set orchards to plums—Meek & Luelling, George Walling, Seth Lewelling, and others; later, P. F. Bradford, Dr. O. P. S. Plummer, S. A. Clarke, Dr. N. G. Blalock, and a multitude of others too numerous to mention.

It was not until 1871 I put out twelve hundred peach-plum trees. There was then a great demand for large pitted plums in the Eastern market, and our grocerymen called for them in considerable quantities at home, and often said to me: "Set out pitting plums and peach-plums, and don't set anything you can not pit, for the American people don't want a prune with the pit in it. They don't like them." A few of our large-pitted plums had reached the St. Louis market, and were selling readily at 35 cents per pound. We figured two hundred pounds to the tree, then thought to be a conservative estimate, one hundred and sixty trees to the acre, and forty acres in plums, at 15 cents a pound, dried. This was good, better than a quartz mine; divided by two it seemed good enough. Time passed. Market reports East showed active demand for pitted plums. Leading wholesale grocers ordered, and said we need not fear an over-supply of plums as per sample sent, and that there was nothing so fine on the market. We sold at 16 cents per pound, and were assured that they could not drop much below that price.

A correspondent, a grower, Mr. S. J. Brandon, of New York, had discovered, or thought he had, that a heavy clay soil, very like our

hilled lands, was unfavorable to the curculio, the blighting pest of the East that had discouraged plum and prune growing in the States east of the Rockies. Mr. Brandon, however, was growing successfully a forty-acre orchard of Reine Claude plums on heavy clay land in New York, and was reaping a golden harvest from the green products in New York City market.

Another correspondent, Prof. C. V. Riley, then State Entomologist of Missouri, afterwards Government Entomologist at Washington, had written me that the curculio did her work at night, and only when the thermometer was above 75 degrees F.; lower, she was chilled and could not work. This enthused us. As our nights are uniformly below that temperature, I concluded, and yet think correctly, we should not be troubled with that pest, the one pest that had discouraged the growing of plums and prunes in the East. We have no doubt often had the curculio imported from the East in soil about plants, but up to date I have not seen or heard of a curculio on the Pacific Coast.

I set one thousand Italian prunes, and—with the idea of filling in the drying season from the early peach-plum to the Italian prune—successively for some years I set out the following varieties: Five hundred late peach-plums, five hundred Washington, five hundred Jefferson, five hundred Columbia, five hundred Pond's, five hundred Reine Claude, fifteen hundred French prunes, twelve hundred Coe's Golden Drop; cultivated—plowed twice, hoed around trees twice, harrowed four times, and finished with clod-crusher and leveler, made of six-inch fir poles, five pieces six feet long, spaced six inches apart, two-by-four scantling spiked to ends, which has to this time proven the best implement for this purpose, and seems to me almost indispensable as a finishing tool in cultivating our clay hill soil.

The winter of 1878 was cold, the thermometer falling to zero, with stormy northeast winds for weeks, ending with a heavy snow storm. The cambium wood froze and turned dark, almost black, the bark burst loose almost entirely on many trees, particularly the peach-plums. Over in Clark County, Washington, and about Portland, we thought our trees were killed; yet, in the spring, to our surprise, they nearly all grew and seemed not injured, excepting on the southwest the bark of the peach-plum died, as judged, on account of the warm 2 o'clock sun while the trees were yet frozen. In a few years the damage was scarcely noticed.

The first year of bearing I sent two carloads of peach-plums, wrapped in papers and carefully packed in twenty-pound boxes, to the Chicago market. The weather was warm in transit, they were delayed, and arrived in bad condition, and were sold for about the freight bill, commission, and other charges. I made other ventures of this kind and learned in the dear school of experience that the peach-plum did not carry well, and could not be profitably shipped so far east. Our commission merchants tried many such experiments, and I do not know

that any one ever made anything shipping peach-plums East, and I do know there were many losses, and the business was abandoned.

Early in the seventies I built the Acme fruit evaporator, bought a Lily pitter, which pitted three thousand five hundred pounds in ten hours, and, after the failure of my shipping scheme, dried the entire product of my orchard. For some years, starting at 16 cents per pound, the business paid nicely, then prices dropped to 14, 12, 10, and down, until 1890 they were a drug in the market at 6 cents, unsalable, and were held over, some for three years, and were then reprocessed and sold at a loss. The fashion had changed, the fad was off, people were tired of pitted plums, the trade turned to prunes, the call now was for prunes with the pit in, as it was claimed to give the true prune taste, which the pit alone could do. This was disastrous. What should I do with my plum orchard? Here was a condition serious. I was theorizing: "Was it possible to graft new heads on these trees successfully?" This was questioned; orchardists shook their heads and thought it too big an undertaking. Some advised digging up the trees to set prunes. I was selling prunes at 12½ cents per pound in fifty-pound boxes, faced. Our Italian prunes led the market, and were readily salable at that figure. This was paying fairly well; a legitimate business, so to speak. We were then possessed of the idea that we had a little neck of the woods in Western Oregon and Washington—the only spot in this great continent that could grow successfully the Italian prune. We were led to think this as they had failed in California, the East, and other localities, and, presumably, they required a heavy clay soil, and a cool, damp climate, and we didn't know of any other such country, and we were growing them successfully, and we had the verdict of the markets and all comers to that effect.

In 1871 I secured an experienced top-grafter, started in April and grafted twelve hundred twenty-year-old peach-plums into the Italian prune, putting ten to thirty grafts in a tree. It looked destructive. Orchardists looked wise and said it was an experiment; some thought it would not succeed. I had tried a few trees the year before with my own hands, and was hopeful. It did succeed. Fully 95 per cent of the grafts grew; enough so that no further grafting was necessary, while some trimming out was necessary. I did not lose a tree—this at a cost of 10 cents a tree. I trimmed back the new wood annually, and in three years had a good bearing top, which thereafter bore the largest, finest prunes grown in the vicinity. These I wrapped, packed in twenty-pound boxes, and shipped East. They carried well and gave very satisfactory returns. I shipped seven cars one season. They averaged me $1.25 per box in the Eastern market, leaving a nice profit. Continuously every year after this gratifying result I thus worked over about one thousand trees, until forty-four hundred plum trees were all worked over into Italian prunes, with like success and with a loss not exceeding fifty trees. It was said and believed by many that the union would not be good at the graft, and trees thus treated would break

down under a heavy load of fruit or from our occasional heavy sleets. This has not proven true—only a suspicious foreboding. Under a heavy weight of fruit and in two heavy sleets the union of the graft, to the contrary, has proven to be as strong as any part of the tree, and it has transpired that this top-grafting is not so difficult and mysterious a handicraft as is generally supposed. Any careful, painstaking man can, in a few hours, learn to set a graft; and so with the waxing, etc. A sharp grafting knife, a trimming saw, a package of cotton batting, a waxing brush, and a heating appliance with kettle of grafting wax, is all the equipment required. For wax, linseed oil, and resin, heated and mixed to a right consistence (which is a matter of a little common sense experience.) A man who could not learn to top-graft in a day or two of experience I should not consider an orchardist or fit to work in an orchard.

My grafting has been done in March, April, and May, sometimes even after trees were in bloom and leaf. Scions cut in January or February, tied in bunches and set (cut ends down) in loose earth on the north side of a building, under shed, have always kept well.

Now it transpires that Eastern Oregon, Washington, Idaho, Montana, British Columbia, and other localities, grow successfully the Italian prune, and could probably supply the market of the United States. California set great areas of French prunes, and overdid the business, as Californians are apt to do. Probably California, in the near future, will produce more prunes than the world now consumes. For these and other reasons prunes annually dropped in prices from 12½ to 4 cents, and 3½ cents, the present offering. This year the four sizes of French prunes are held at 2½ cents base, and slow movement. California is in the hands of a combine, even at these prices, and the Eastern market proposes to hold off and break the combine and get prunes yet lower. The few prunes that are sold now are sold outside the combine at lower figures. Canned goods and green fruits are taking the place of the prune. It remains to be seen whether the combine will hold or break. To hold possibly means that the opportunity to sell will be lost and stock held over. To say the least, the condition is not encouraging. The trade calls for a large black prune. The French prune grown in Oregon is small and light colored and can not compete with the larger dark French prune grown in the Santa Clara Valley, not to speak of their advantage in sun-drying. I have one thousand five hundred twelve-year-old French prune trees yet to work over; am growing wood of the Burbank sugar prune for scions. California is setting and top-grafting into this prune extensively. Everything is claimed for it. "Three weeks earlier than the French, much larger, sweeter, drying forty-five pounds to the hundred; ever bearing enormously; tree vigorous; free from blight or disease of any kind," etc.

In 1872 set three hundred Royal Ann cherries, three hundred Black Republican, and later, four hundred Bing, seventy-five Lambert, sixty Governor Wood, fifty May Duke, and one hundred Early Richmond;

for some years the Royal Ann and Black Republican brought from 50 cents to 70 cents per pound, in ten-pound boxes for shipment East. This was fairly remunerative, but of late, on account of fungi, the Royal Ann has not carried well in the long haul; is easily bruised, turns black on the facing, and altogether is an unattractive and unsalable fruit in the Eastern markets. We have discontinued shipment. Canneries have come to the rescue and now contract our fruit at 3½ to 4 cents loose, boxes returned. This, also, will be fairly remunerative. Large dark cherries ship well, sell well, and probably will remain profitable. The world's fairs of 1893, and since, revealed the fact that we grow the largest, showiest, and perhaps the finest cherry in the world. Somehow, we ought to do well with our dark cherries. Sixty Governor Wood and fifty May Dukes, after ten years' experience, were worked over into Royal Anns, with the same success in the grafting as with the plum. To-day only an expert would notice the graft or any change in the growth.

The object of this grafting story is to say, "Don't dig up old trees because the fruit does not suit you, graft into sorts that will suit you." Spraying, enriching, and deep cultivation will rejuvenate old trees and bring them into vigorous bearing long before you could realize from setting young trees, and at much less expense.

Ten thousand square miles of the valleys and foothills of Oregon are in every way adapted to the culture of all the fruits grown in this latitude, of the finest quality and in great abundance. Before the advent of the white man and cultivated fruits, this country had demonstrated its capacity to produce the wild fruits abundantly, of fine flavor and excellence. The Indians, trappers, and pioneers valued these highly and made good use of them. As they were in some sense evidence of a soil and climate adapted to and prophetic of a great industry now growing up among us, it is not out of place to briefly make some record of them; and this seems the more important in view of the fact that the pomological division of the Department of Agriculture has taken up the subject and is making collections and urging the improvement of indigenous fruits and hybridizing and cultivation of them and in view of the fact that some of our best fruits have been thus produced.

The Oregon crab apple (*Pyrus rivularis*) is found on cold, marshy ground, bordering ponds, mountain springs, and streams, and when favorably situated is a good sized tree and attains a diameter of one foot, and an altitude of twenty feet. Its rich green spreading top in the season bears heavily a small, oval, golden-colored apple, which when ripe is eaten by the Indians, and was used in early times by the white settlers for making preserves, jelly, and vinegar. This species has been hybridized and improved by some of our nurserymen, and no doubt will be further improved, which may lead to a valuable variety in the future.

The Oregon wild plum (*Prunus subcordata*), of which there are two or three varieties, was much valued in early times for its fruit to eat green, for preserves, and jam. This plum for quality is about the same as the native red plum of the Middle West, and has been improved by selection and cultivation; was used formerly by nurserymen for stock on which to graft the plum and prune. The tree grows to a height of ten or fifteen feet. Another variety produces a round fruit nearly an inch in diameter; another an oblong, resembling in shape, color, and quality the Damson, and by those who use them preferred to that variety. Of these something may be expected from hybridizing and cultivation.

We have two or more species of wild cherries; one, *Cerasus demissa*, a shrub or small tree bearing a purplish black fruit, very much resembling the choke cherry, though of much better quality and edible; is used to some extent in marmalade; its roots have been used as stock to work improved varieties upon. The other, *Cerasus mollisginata*, sometimes attains to the dignity of a tree one foot in diameter and thirty to forty feet high, and bears a roundish, black cherry about one-third of an inch in diameter, bitter and astringent.

The Oregon elder (*Sambuscus glauca*) is a unique tree of unsurpassed elegance and rare beauty on the lawn or in the forest; is of vigorous growth, attaining two feet in diameter and thirty feet in height, with a beautifully cut leaf of rich bluish green, decked with showy sprays of creamy white flowers six to ten inches across, and in the fall of the year gorgeously arrayed and heavily laden with purple berries, interspersed with green fruit and blossoms, which continue to bud and bloom from June to September, giving a succession of flowers, green fruit, and ripe purple berries the entire season. The berry has a pleasant sub-acid taste, and with a little sugar is palatable in pies, stewed, or in preserves, and properly prepared makes an excellent wine, for which it is now often used. Another variety of smaller growth (*Sambucus callicarpa*) has a red berry, also edible. This variety is not so widely distributed, and is only found along the coast and up the streams inland.

The grape (*Vitis Californica*) is found in the southern part of the State, and has been much used in other countries as a phyloxera resistent stock, on which to work European varieties. This fruit is something like the fox grape of the East, and has been some improved by selection and cultivation, and will doubtless be of value in the future.

Oregon is a land rich in native berries, which were held in great esteem by the Indians and early settlers, some of which are really fine and yet much sought after and utilized, and form a considerable commerce in our towns and cities.

The wild blackberry (*Rubus ursinus*) is very abundant everywhere, and takes possession of neglected fields, fence rows and burned districts. The fruit is of good size, oblong, very sweet and juicy, and believed by the children and good housewife to be for all purposes much superior to

Wasco County Exhibit at Lewis and Clark Exposition

the cultivated varieties. Tons of this fruit are gathered and sold to families, and if there were more pickers a large commerce could be made with the canneries. The Aughinbaugh is a sport from this species.

Of raspberries, we have four varieties—the salmon berry (*Rubus spectabilis*), a large, yellowish or red fruit, with a red blossom, juicy, sweet, highly flavored, very palatable; a red berry (*Rubus strigosus*), highly aromatic, soft, sweet and very good; a black cap (*Rubus leucodermis*), not unlike Gregg's black cap, and with us, under cultivation, fully its equal. This berry is widely distributed and abundant. A black raspberry, being rather hard and dry to rank first-class, yet with a peculiar flavor; very palatable to some tastes.

The wild strawberry (*Fragaria Chilocnsis*) is widespread, abundant and very prolific, so that in some regions it is said hogs fatten on them. The berry is not large, but improves under cultivation, and by some is classed superior in flavor to the cultivated kinds. Several fine varieties have been produced by cross fertilization with this, among which are the Triomphe de Grand, True Chili, and several other varieties.

We have several wild currants, one a beautiful shrub and sought in the Eastern States and Europe as an ornamental lawn plant, and valued for its elegant foliage and early and profuse bloom of pink and scarlet flowers; berry not edible. The yellow currant (*Ribes aureum*) responds well to cultivation, and in the wild state is good sized and edible.

Of gooseberries, two or three kinds are common. *Ribes Menziesii* is a large, hairy berry, edible, but rather insipid, and is not much used. Two others are red and brown when ripe, a fourth of an inch in diameter, sweetish, tart; good for culinary purposes; do not know of their cultivation.

Four or more huckleberries are found in the State. *Vaccinium parvifolium* is a pale, red berry, small, dry, with a very slight cranberry taste, and not used. *Vaccinium ovalifolium*, high bush huckleberry, is a large, blue berry, good and in some localities where fruit is scarce very useful; much sought by the Indians. *Vaccinium microphyllum* is a red, high bush huckleberry, smaller, juicy and palatable; only found high up in the mountains. Another is found in the Cascade and Coast ranges as an evergreen bush, and bears a dark, purple berry; edible. Local botanists speak of other varieties.

The barberry (*Berberis Aquifolium*), Oregon grape, so-called, is a superb and elegant ornamental evergreen shrub, in leaf somewhat resembling the English holly; in the wild state growing two or three feet high; under cultivation making a showy lawn plant, six to eight feet, with finely cut, polished leaves and symmetrical head; early in spring bearing a profusion of showy, yellow flowers, followed in their season by clusters of dark purplish black berries, the size of wild cherries; altogether a thing of beauty rarely equaled; fruit acid and make a fine beverage, and good pies and preserves. There are others of the barberry family.

The salal (*Gaultheria shallon*) is scattered through the dense fir forests of the State; is another beautiful, small shrub, evergreen, bearing an acid, edible berry, size and color of the Oregon grape; much sought by the Indians, and in early days made an excellent wine for the resident Hudson Bay Company employees. The salal is a variety of wintergreen, and seems to thrive best in the deep shade of the forests; has not been cultivated.

The serviceberry, or Juneberry, a small tree six to twelve feet high, we expect to make a good record for in the future. This has been cultivated in other parts of the world and much improved. The serviceberry in the Willamette Valley grows in all soils, and at altitudes as high as the snow line, bearing a sweetish, pleasant tasting berry about the size of our largest wild cherry; as yet it has not been cultivated with us or much utilized.

A black haw (*Crataegus brevispina*), not unlike the black haw of the Middle West, is sparsely found in some localities.

Our one filbert, hazel nut (*Corylus Californica*), is of the same species as the imported nuts in our market, and closely approximating in size, flavor and quality, and grows everywhere in our valleys, sometimes to a tree ten inches in diameter and from eight to fifteen feet high. No effort is recorded of any attempt to cultivate or improve it.

A kind of chinquapin chestnut (*Castanopsis chrysophylla*), is a symmetrical growing tree, fifty to one hundred feet high, bearing abundantly a small, hard-shell chestnut, sweet and edible.

It is not too much to say that all the valleys and foothills of Oregon are fruit lands, and abound in choice spots for the different fruits cultivated in our climate.

As, perhaps, is always true in a new country, the fruits of Willamette Valley were uniformly large and free from insect pests or fungus blights, consequently made a superlatively fine showing, stood handling and transportation much better than the fruits of this valley to-day, kept much longer and better; in fact, our winter apples and pears generally kept until late in the spring. I premise that persistent and thorough spraying may correct the present degenerate condition—pests and blight.

In those days it was not uncommon for Yellow Newtowns, Spitzenbergs, Winesap, American Pippin, and the Easter Buerre pear, to keep well, sometimes marketable as late as April and May. The Winesap was then a fine keeper, as was also the Winter Nelis and Easter Buerre.

We have always had the reputation of growing the largest fruits, proven at all the world's fairs in this country, since at Philadelphia in 1876. Yet larger were the first fruits in the fifties and sixties. A letter from Mr. John Barnard, published in the *Oregonian*, a few days since, will give some idea of the size of the Gloria Mundi apple, which in those days was not uncommonly twenty-four to thirty-six ounces in weight. Other apples were accordingly large. I quote:

In 1856, fifty years ago, there was an apple grown in Benton County, Oregon, purchased by my brother, A. D. Barnard, of Corvallis. He paid $5 for that apple, and had a tin box made for it, and sent to me in Boston by express, the charge being about $3. The variety was "Gloria Mundi," nearly six inches in diameter, weight forty-two ounces. The apple was weighed by Dr. J. R. Cardwell, the dentist, then visiting at Corvallis, who remembers the apple and price paid for it. The next October, 1857, I came to Oregon, went to Corvallis and paid $8 a bushel for Oregon red apples and sold them at $1 a dozen.—JOHN L. BARNARD.

To make record of a perhaps original horticultural trick, and the possibilities of the Pound pear, I vouch for the following story, which I know to be true. It was how Mr. J. W. Walling beat the world's record possibly for all time, in the growth of the Pound pear.

As is evident, Mr. Walling was somewhat original and withal a practical fruit grower. He inarched into one body two of our native thorns (*Crataegus brevispina*) of thrifty growth, planted in a black, loamy soil near a flowing spring. On the top, thus growing inarched into one body, he grafted the Pound pear. When this tree came into bearing, of good size and vigorous growth, he removed all the young pears but two of the largest and most promising. These he suspended in sacks to support an unusual weight. In the dry season of the late summer and fall, a large tub with spigot filled with water to supply just the right moisture, was placed over the roots. The result of this proceeding was two enormously large pears, one weighing fifty-four ounces, shown in some of our local fruit meetings, probably in 1858. This pear was sent to the Department of Agriculture, Washington, D. C., and was rightly regarded as a world's wonder in the pear family.

Our Royal Ann cherry (*Napoleon Bigarreau*), clean, bright, and beautiful, ran in those days, three to three and one-fourth inches in circumference. Peaches, when we had them, strawberries, blackberries, gooseberries, and currants, accordingly large. The size, quality, and beauty of our fruits were always a surprise to newcomers.

In the summer and fall of 1857 a few ambitious and competitive fruit growers of Multnomah County attempted a social organization in Portland. The first meeting was in cherry time, held in a vacant room on Front Street. Boxes and heavy bearing limbs of berries and cherries, with flowers and vegetables of the season, tastily arranged on tables, made quite a respectable showing; in fact, a display that would be creditable at the present day—1906. Such cherries, blackberries, strawberries, gooseberries, and currants had never been seen on exhibition before. There was no sign of fungus or insect pests—clean, bright, ripe fruits.

George Walling, Albert Walling, Henry Miller, Thomas Frazier, J. H. Lambert, James B. Stevens, Henry Prettyman, J. H. Settlemeir, Seth Lewelling, were leading spirits, all enthusiasts and practical fruit growers, knew about fruit growing, and did most of the talking. Thomas Frazier was elected president, and Albert Walling secretary.

Monthly meetings were held for several months; called meetings were held two or three times in the summer and fall of 1858. In 1859 the Multnomah County Agricultural Society was organized, with Thomas Frazier president, Albert Walling secretary. About this time the first State fair meeting was held at Clackamas, a suburb of Oregon City; W. H. Rector, president, Albert Walling, secretary.

In 1858 the following agricultural societies were organized, and these all meant largely horticultural societies:

Corvallis, Benton County, October 13, a county fair with fruit display; A. G. Hovey, president, and E. M. Waite, secretary.

Albany, Linn County, a fair, October 28, 29.

Salem, September 5.

Lane County, Eugene, September 11, 12; A. McMurry, president, E. E. Haft, secretary.

Yamhill County, McMinnville, October 27, 28.

Jacksonville, October 25.

A county fair at Eugene, October 9; president, W. S. Brock, secretary, B. J. Pengra.

These societies all inaugurated annual fairs, with competitive exhibits of fruits, grain, and livestock. They did much to educate the people and promote the fruit industry of the State, leading up to the permanent establishment of the State Horticultural Society and State fairs.

In 1861, October 1, 2, and 3, a State fair was held in Oregon City. W. H. Rector was president, and Albert Walling, secretary.

Marion County fair at Salem, September 11 and 12.

Linn County, Boston fair, September 18 and 19.

Umpqua Valley Agricultural Society Fair at Oakland, September 12.

Yamhill County Agricultural Society and fair at McMinnville, September 24 and 25.

Benton County Agricultural Society fair at Corvallis, October 3 and 4.

Lane County Agricultural Society fair, October 9 and 10, Eugene.

Washington County Agricultural Society fair at Hillsboro, October 16 and 17.

Multnomah Agricultural Society and Fair, October 23 and 24. Thomas Frazier, president, and Albert Walling, secretary.

State fair at Salem, September 20, October 1, 2, and 3. Major Simeon Francis, president, and Samuel May, secretary. Hon. R. P. Boise delivered the annual address.

For the first three years the Oregon State Agricultural Society, first meeting at Clackamas, second at Oregon City, and third at Salem, had quite a considerable premium list, which was promptly met by the society without State aid, a three-dollar membership fee, the generosity of the public and members furnished the necessary money.

On petition to the Legislature setting forth the situation, urging an appropriation for more efficient work, to secure a permanent organization, the matter was taken up by the Legislature, discussed pro and con, and finally an appropriation of $3,000 per annum was passed, since

which time the society has had State aid. At the fourth fair, at Salem, George Collier Robbins, of Portland, was elected president, Albert Walling, secretary.

This society has been an important factor in promoting the agricultural interest of the State, now a permanent State institution holding a creditable State fair at Salem annually.

The Oregon State Horticultural Society was organized in Portland, January 13, 1889, with a long list of active members from all over the State. J. R. Cardwell, president, E. W. Allen, secretary.

For many years quarterly horticultural meetings were held by invitation from the different towns of the State, with marked interest and beneficial results to the horticulture of the State, financially, fraternally, and socially.

The local interest and generosity of resident horticulturists in the display of fruits, flowers, decorated halls, music, excursions through the country, well-ordered ovations, the defraying of all expenses of visiting members and the society, was a notable feature of these gatherings. Able papers were read and discussed, the best social feeling prevailed, and everybody went away feeling better and wiser.

The Oregon State Horticultural Society is now a permanent, prosperous State institution, active in the work of horticulture. Semi-annual meetings are held, the annual meeting, January 13 in Portland, and one summer meeting out, as designated by the executive committee, on invitation of outside localities. The next summer meeting to be held in Salem, July 6 and 7.

The society has had two presidents in the eighteen years of its existence. The Honorable E. L. Smith, of Hood River, and Dr. J. R. Cardwell, of Portland. Prof. E. R. Lake, botanist and horticulturist of the Agricultural College of Corvallis, has been the very efficient secretary and treasurer for the last twelve years.

The State Board of Horticulture is a creation of the Legislature of 1889, approved by the Governor February 25, 1889. The measure was entitled "An act to create a State Board of Horticulture, and appropriate money therefor." This has proved an opportune and very efficient board, an educational aid in the inspection and eradication of insect and fungi pests. Thirty-five hundred dollars per annum was appropriated to maintain this Board.

The following officers and members were appointed by the Governor: J. R. Cardwell, president, Portland, Commissioner for the State at large; James A. Varney, The Dalles, Inspector of Fruit Pests, Commissioner for the fourth district; R. S. Wallace, treasurer, Salem, Commissioner for the second district; Henry E. Dosch, Hillsdale, Commissioner for the first district; J. D. Whitman, Medford, Commissioner for the third district; James Hendershott, Cove, Commissioner for the fifth district; E. W. Allen, secretary, Portland.

District Boundaries.—First district: Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook counties. Second dis-

trict: Marion, Polk, Benton, Linn, and Lane counties. Third district: Douglas, Jackson, Josephine, Coos, Curry, and Lake counties. Fourth district: Morrow, Wasco, Gilliam, Crook, and Sherman counties. Fifth district: Baker, Wallowa, Malheur, Harney, and Grant counties.

The biennial reports of this Board have been well received at home and abroad, and are now an acknowledged authority in the horticultural literature of the State. These reports were awarded at the Pan-American Exposition, Buffalo, New York, a gold medal; at the Trans-Mississippi Exposition, Omaha, in 1898, a gold medal; at the Interstate and West India Exposition at Charleston, South Carolina, 1902, a gold medal; at the International Exposition, held at Osaka, Japan, in 1903, a gold medal. Are now used as text-books at the Agricultural Experiment Station at Sapporo Nokkaido, Japan, and in the horticultural studies at the Agricultural College, Stuttgart, Germany.

The present officers and members of the Board are: W. K. Newell, president; James H. Reed, treasurer; Geo. H. Lamberson, secretary, Portland. W. K. Newell, Gaston, Commissioner for the State at large; James H. Reed, Milwaukie, Commissioner for the first district; Chas. A. Park, Salem, Commissioner for the second district; A. H. Carson, Grants Pass, Commissioner for the third district; R. H. Weber, The Dalles, Commissioner for the fourth district; Judd Geer, Cove, Commissioner for the fifth district.

The reports and work of the State Board of Horticulture unquestionably have been of great value to the fruit interests of the State, notably as an educator in a knowledge of insect and fungous pests, spraying material and equipments, and the best practical methods of their uses in cleaning infested orchards, and keeping clean. Clean orchards and clean fruit is now the rule in all successful orcharding. This has been a slow educational process. It is difficult now to realize the ignorance and consequent indifference of orchardists on this subject, particularly the former small orchardist.

The difficulties the Board had to contend against would make a curious and interesting chapter in the study of human nature. Verily in the beginning, to put it mildly, this was a most uninviting work. Antagonism to and defiance of orchard inspection was almost the rule. To tell a man that his orchard was lousy with the bark-louse, infested with San Jose scale, green and woolly aphis, or the borer; diseased with fungus growth, and that the law required him to spray, was often an unpleasant duty; sometimes leading to personal difficulty, and, as sometimes happened, a threat to bring out the old shot-gun to defend his home and personal liberty, to do as he pleased with his own.

In this defiant spirit the courts have been appealed to. Thus far the Board has been sustained and the law adjudged constitutional. Orchardists have learned the wisdom of the law; the farmer-orchardist has been educated to consider the law more tolerantly, and to meet the inspector as a friend and co-worker. In these trying times referred to, David M. Dunne facilitated the work of the Board by originating,

manufacturing and widely distributing a concentrated solid compound of lime, sulphur and salt. This in convenient packages was easily and cheaply transported, ready for use by the addition of hot water as per directions. As the preparation of this spraying material was somewhat of a painstaking, tedious process, Dunne's solid spray was opportune and was endorsed by the Board and State Agricultural College. Lime, sulphur, and salt are largely used in the Eastern States and all over the country effectively for San Jose scale, fungi and other pests. It is known as the Oregon Spray. This in competitive tests has been awarded two gold medals, and is believed to be the most efficient insecticide known, specifically effective in the destruction of the San Jose scale. Later, Mr. Dunne manufactured a liquid spray, sulphur and lime, which it is claimed, is equally effective. Sprays No. 1 and No. 2, the orginal solid form, are yet extensively used.

ECONOMIC FORESTRY.

By EDMUND P. SHELDON,

Read before the Oregon State Horticultural Society.

It may be stated without fear of contradiction that outside of food products no material is so universally used and so indispensable to human needs as wood.

Civilization is built on wood, over half the people in the world live in wooden houses and the other half live in houses in which wood enters into the construction. Wood serves to ornament our homes, to warm them—more than two-thirds of the people of America still use wood as fuel. There is hardly a human activity but what wood has played an important part. Miners need timbers for their mines, railroads require millions of wooden ties, and millions more for renewal every year. With such a demand for wood, and its rapid disappearance in America, the economy of forestry makes an interesting matter for us to consider. Furthermore, here in Oregon where we have the greatest supply of untouched timber as yet left in the United States, it becomes worth our while for a time to consider the great resource which is at our disposal, and also to consider some of the dangers which lie ahead of us as a State, and especially as a fruit-producing State, if proper methods of economy are not pursued in conserving this, the State's greatest natural resource. In order to produce fruit we must have the continuous flow of streams and rivers which rise in forested regions. If the forests at the head of such streams are preserved, a perpetual flow of water is assured. When those forests are removed, floods, drouths and disaster follows in the wake of such removal.

The great problem of irrigation, absolutely necessary in growing fruit in a large portion of Oregon, is therefore entirely dependent on the preservation of our forests at the head of streams from which water is derived for irrigation purposes. The United States Government has therefore quite wisely reserved large portions of our forests so that an assurance can be given to our fruit growers of a steady, continuous flow of water in the streams and rivers of the State. I said preservation. Now, I do not mean by that an absolute preservation of our forests intact, we should protect them against fire, and destruction from any cause. But I do mean that forests should be kept growing just as a thrifty orchard should be kept growing. I mean too that the crop of mature trees should be harvested just the same as any other crop. When a tree has reached its maturity it should be cut, made into lumber and the lumber used for the various needs of man. It should not be allowed to die and rot and its huge carcass lie in the way of other young trees which are there ready to take its place.

Now is forestry practical? Has it proven itself to be practical? I think so. The object of forestry is to make the forest render its best *service* to man so as to increase its value and usefulness in the future. The best investment of capital is one which yields the highest rate of interest. No matter how much we hate to admit it we live in a commercial age. We think in figures, many of us dream in figures. One old, toothless violinist on the street the other night, with hat off showing his bald head and a fringe of white hair about his ears, sang a quaint melody and drew a crowd. Then, having his crowd he passed his hat, and as he passed it he sung, "Now I likes to play dis fiddle, and I likes to sing dis song, but if you don't cough up some nickels, I won't be here very long."

What are the requirements for the best service a forest can give? Mr. Gifford Pinchot, head of the United States Bureau of Forestry, says: "There are four things a forest must have before it can be in condition to render the best service. First, protection, especially against fire, over-grazing, and thieves, for without such protection no investment is secure and the most skillful management is of no avail. Second, strong and abundant reproduction. A forest without young growth is like a family without children, it will soon die out. Forest destruction is worse than race suicide. It is like killing all infants because they are in the way and helpless. Third, the third requirement is a regular supply of trees for the ax. This can be secured only by the right proportion of smaller trees constantly maturing in the growing forest. A forest of 10,000 acres composed of 100 even-aged groups of trees of every age from one to 100 years, each group 100 acres in extent would plainly be able to furnish every year 100 acres of 100-year-old trees ready for the ax. In such a forest the right proportion of young trees would always be coming on. Fourth, the fourth requirement is growing space enough for every tree, so that the forest as a whole can not

Bartlett Pear Trees, Orchard of Mr. Plog, Hood River

Bartlett Pear Tree, Orchard of J. L. Carter, Hood River, Oregon

only produce wood as fast as possible, but the most valuable wood as well."

One great central idea of forestry is that the crop should be equal to the growth and if the principle of preservation be carried out, the growth should be equal to the crop. How about the Pacific Northwest in this respect? The growth has in Oregon so far been equal to the crop and the amount of destruction of fire. I make the statement although I expect some will take an opposite view of the situation.

In the other Pacific States in California and Washington the growth has probably equalled the crop, but not the crop and the destruction by fire.

It is plain to see that if Oregon had three hundred billion feet of timber a year, and if it takes 300 years to grow an eight-foot fir tree, and we cut only one billion a year, that the supply can be kept up.

But in considering Oregon we must bear in mind that only a small fraction has ever had the mature timber harvested.

An important thing to consider in the preservation of forests by use is seeding. Douglas fir, the dominant tree of the Pacific Coast, seeds very rapidly, especially on burnt-over ground. There are those who contend that it will pay financially to burn over logged lands to destroy what are considered "weed trees," hemlock, yew, and western hardwoods, willows, etc., are thus considered as weeds. There is a great field for original investigation in determining whether these trees are really detrimental or not. This is one of the reasons why I have always been a strong advocate of a careful, systematic study of Oregon forests by experienced forestry experts before rational and really safe forest fire legislation can be enacted in this State.

The very existence of lumbering in the future, and lumbering is the second industry in Oregon to-day, and the fourth in the United States, depends upon the success of our work in putting practical forestry into effective operation.

There is no doubt that the United States as a whole is utilizing its forest supplies much faster than they are being produced. They can be renewed and maintained by co-operation between the forester and the lumberman. In fact that is what this great forestry movement really means. Lumbermen are nowadays becoming foresters, because they see they have to, because they see it pays.

The tendency to-day in lumbering is to reduce waste in every direction. The first step in this is in the mill. Modern mills cut immense quantities of lumber, but they save what formerly was wasted. The tendency to save has gone to the woods where the logs are cut. Better systems are being evolved to get timber out of the woods with less waste than heretofore.

The one great question which now most interests the progressive lumberman is how to perpetuate their industry.

WHAT LUMBERMEN ARE PREPARING TO DO FOR FORESTRY.

The National Lumber Manufacturers' Association, at its meeting at Chicago, May 10, 1905, started a movement to endow a chair of forestry and practical lumbering at Yale College. This association, which has affiliated with it practically all the lumber associations in America, and therefore, all the leading lumbermen from the Atlantic to the Pacific, will raise by subscription $150,000 to endow this chair. Young men who take this course in practical lumbering will have the very best opportunties for actual lumbering work as well as a thorough training in the scientific part of their profession. Such young men will receive the preference on the part of lumbermen who want high-class men for their operations. If lumbermen want foresters is it not a good sign that they are willing to educate them?

In other words, the lumbermen of America endorse forestry because it means money to them. They need men technically trained, just the same as the manufacturers need the graduate of Technology Institute.

The lumbermen are becoming foresters themselves because it is practical. They are educating their future employees in practical forestry because they want them; in other words, they need them in their business. Mr. Frederick Weyerhaueser, one of the most progressive and most extensive lumber operators in America, has been appointed chairman of the committee to raise this endowment fund.

If you talk to any progressive lumberman to-day you will find he is in favor of forestry because it is practical, because it means dollars and cents to him.

WHAT FORESTRY HAS DONE FOR MAN.

In approaching this part of the subject, it is necessary to recount what destruction of the forests man has wrought by his own folly and how forestry has helped him to replace what he has so recklessly wasted.

In Europe and Asia, older civilized countries than ours, the early inhabitants did just as the early pioneers in America did, destroy the trees so as to produce crops. Man early considered trees his natural enemies and devised means of cutting them down and destroying them.

But necessity for reform became apparent when, as a consequence of the reckless denudation of such mountains as the Alps, Cevenees and Pyrenees, whole communities became impoverished by the torrents which came pouring down upon the fertile lands at the foot of the mountains. This in France was paralelled in Germany, Italy and other countries, and the present modern forestry movement began.

Droughts, floods, pestilence always follow in the wake of destruction of the forests. The banks of the Nile were the early source of the wood supply. The civilization of Egypt, of Greece, of Rome, all declined and westward the course of Empire took its way, all because of the destruction of forests by man.

The Bible is undoubtedly the greatest book in history. From a purely historical point of view, I wish to point out to you what destruction and devastation man wrought in those early days.

From the Caspian Sea, extending westward through Asia Minor, is a range of mountains, one portion the Taurus belts the Mediterranean on the north. The other branch, the Lebanon Mountains, parallels the eastern shore of that sea to the Leontes River. At the time of Kings David and Solomon these mountains were covered with dense forests of mighty trees. This country and the plains below supported a very dense population. It was a great lumbering nation. The cedar of Lebanon was the wood of the world. But what happened, the forests were removed, destroyed. So long as the mountains retained their forest covering, clouds were attracted, rains were frequent, water was plenty for agricultural purposes. When the forests were removed all along the Mediterranean Coast, the result was, agricultural disturbances, droughts, famines, pestilence, and ultimately an almost total barrenness. Judea and Israel were diminished in numbers, and early subdued and scattered by other nations. I might record historic droughts, and could trace them all to destruction of the forests.

How about the United States? There are regions in the Eastern States to-day approaching barrenness and nothing but forests will restore the land to its value again. This then is the prime cause of the forestry movement, necessity.

Here on the very verge of Western civilization it is worth while to pause and consider what forestry has done for man. What are the conditions in Europe at the present time? Let us consider a few of these European countries and see what they have done.

The country which has attracted the greatest interest in forest matters is Germany. That country, by modern methods, easily leads the world in the care of her forests. There are now about 35,000,000 acres of forest lands in the Empire. The strictest penalties are imposed for destruction. Forest officers rank high in the Empire. They are recruited from among only the brightest students. Subject to years of technical training, and thoroughly inculcated with the principle of "preservation by wise use."

France appropriates annually nearly three million dollars for the care of her forests. Private forest property is absolutely controlled as regards clearing. No clearing or cutting of any sort can go on without the approval of the Government authorities.

India has a well organized forest administration, preserving the forest on the largest forest area under one administration in the world.

Japan is preserving her forests according to the most modern methods. In fact American foresters who have visited Japan to study forestry tell me that the entire world can learn something about forestry from the Japanese.

Egypt has entered the ranks with a forest policy.

Russia maintains the second largest forest area in the world under one administration, and it may be said to the credit of that nation in a day when little good is said of her methods of government that Russia

has preserved her forests by wise use and prevented their ruthless destruction in modern times.

Switzerland has had a long, hard struggle during the first half of the century to come to a rational forest policy, although the damage done by its absence was clearly to be seen.

Sweden and Norway have been the great sources of supply for wood material for the past fifty years, especially supplying England with most of her needs.

Sweden has had a forest policy since 1500. In 1720 a director of forests was appointed, and became the germ of the present forest department. In 1894 a commission was appointed to investigate the condition of the forests of Sweden. As a result of their inquiry it appears that Sweden can continue her present cut, and increase it if more forests are planted.

In considering what forestry has done for man in these countries we must bear in mind that planting trees pays commercially there. Trees are a valuable crop. Aside from the great result to civilization which comes from the maintenance of forests.

In Europe and Asia forests are on the increase. Better conditions prevail. Civilization is paving the way for the support of larger populations every year because of the better climatic conditions due to scientific knowledge.

When the early settlers of the United States encountered nature in their new-found land they proceeded to destroy trees. Forests must be cut down to make farms. Hence millions of acres were thus destroyed to make homes. I don't maintain it was absolutely wrong. It was a necessary part of our civilization. But much land was cleared that was unfit for farms and is now deserted and much of it is being planted in forests to-day again.

The task of opening the back woods to settlement is nearly done. The call is now for forests. And American ingenuity will produce them. Forestry schools have sprung up all over the United States, and the demand for technically trained foresters is increasing, faster than the supply. Twenty years ago Mr. Pinchot, the present U. S. Forester, was considered a theorist, now he is at the head of the most practical work the government is doing.

The very best thing about forestry is that it utilizes ground not fit for agricultural purposes. It does not conflict with agriculture, it helps and aids it in every way.

No ardent friend of forestry will claim that the science will for a long time produce in this country the result seen in many of the densely peopled states of Europe. But a knowledge of these is of value in showing what forestry can do. The science of forestry is the same everywhere, but its application depends upon the conditions which are found in different countries. Suppose we take a natural pine forest or spruce forest in Germany on non-agricultural land in which 75 per cent of the trees are mature and 25 per cent have not yet reached a size large enough

to cut. According to scientific forestry one would cut the 75 per cent just as soon as the market would permit and make room for the rest to grow when the 25 per cent was mature, another 75 per cent would be coming on, different sizes and ages according to the start they got.

A similar natural forest in this country would be treated in the same way, and some lumbermen, such as those for example as hold pine lands in the valley of the St. Croix river in Wisconsin, or as the Weyerhaueser Timber Company is doing in Washington, are going back 15 or 20 years to make a second, third and fourth cutting on the same land. If a trained forester were to begin cutting a mature forest he would not commence on that side of it which is exposed to the prevailing winds, because every cutting would freshly expose the remaining forest on that side to dangers from the wind.

A trained forester would manage the cutting so as to promote natural seeding from the nearest trees left standing. He would begin by first having it surveyed. He would not cruise it. Oh no, Western cruising is not forest mensuration, far from it; it is largely guess work, although there are a few who take the time to count the trees, take their contents and make a map of a forest area.

These principles are in vogue in the countries mentioned above, and are becoming prevalent in the Eastern United States, and a forester must acquire them to become proficient in his work.

The forest is a great soil farmer, most all our black loam, the very best farming land, has been found by forests. We can study this on many places such as, for instance, on the marshes near the sea, we dig down aways and find sea shells beneath the deep formation made by the annual deposit of leaves, sticks, etc., from the trees.

The forest is also a soil improver. The leaf would gradually form where the growth of a forest is encouraged and a much better soil is made for man by growing trees, where trees are grown as a crop, as in Europe this is more apparent than in the western country, where nearly all is virgin soil.

The forest is a great soil fixer. In many parts of the world the wind blows the sand into shifting masses called sand dunes. Fifty years ago Golden Gate Park at San Francisco was such a section of shifting sand. Now many by applying forestry methods has made it one of the most beautiful parks in the world.

I have already alluded to the value of forests as a flood preventer and a moisture holder in the mountains. If the forests are removed, floods, droughts and disaster follows. Of the most valuable thing the U. S. government has done for Oregon has been to reserve portions of our forests around the high mountains so that we may have a steady, continuous flow of water in the streams and rivers of the State.

The forest is of great value to man as a wind break. Why don't we have severe windstorms here? Because we are protected. Cyclones only prevail in sections where there are but few forests. Nothing is more

wearisome than constant wind and nothing more efficient in checking it than belts of forests.

The forest as a beautifier of the earth appeals to all mankind.

The reason the grandeur and beauty of our mountains surpass those of Switzerland is because of the wonderful virgin forests which surround them. The healthfulness and beauty of our mountains and parks can never be replaced if destroyed. The only way is to maintain them.

The forest as a sanitary agent is a necessity of civilization. The purest water in the world from melting shows on our mountains would soon be unfit for use except for the beautiful, forest cover through which it flows. The water in the dismal swamp in Virginia is extremely healthful, though stagnant, while the water from burnt-over lands nearby is full of malaria.

There are many other reasons why forestry is beneficial to man, many other things it has done for civilization. But it will be well to bear in mind the great effect it is having on modern civilization and the effect that the lack of it has had upon mankind.

THE DUTY OF THE FRUIT GROWER.

By A. I. MASON,

Vice President of the Northwest Fruit Growers' Association.

A paper read at the annual meeting of the Oregon State Horticultural Society, held at Portland, January 9 and 10, 1906.

The duties of a fruit grower, in the broadest sense, are unlimited; they are never completed until he has crossed the divide to that "happy beyond." Every fruit grower should execute all the duties of an honorable, progressive and beneficial citizen; but there are a few duties pertaining to this particular vocation, upon which I desire to express a few thoughts. Let me ask you, first, are you doing your duty in cultivating your orchard? Are you doing every thing in your power to keep your trees in a clean, healthy and thrifty condition? Are you making fruit growing a business, or are you making it a side issue?

If the latter, are you not permitting your fellow fruit growers to build up the quality, price and reputation of the fruit grown in your respective districts without you sharing your part of the responsibility?

Are you drifting along in a slovenly, careless and indifferent manner? If so, wake up! Clean out your orchards, spray and prune your trees, and do your work carefully, intelligently and diligently.

Have you ever thought, that if each fruit grower would do his duty, we would need no fruit inspector to condemn our fruit or compel us to spray our trees. A fruit grower who knowingly has an orchard badly

infected and who has to be officially notified by a fruit inspector to clean it out is maintaining a public nuisance, and he becomes an object of pity and a fit subject to attend every horticultural meeting in his State; but unfortunately, he is never there. Every progressive and successful fruit grower should be a constant and earnest reader of our horticultural papers. And our experimental station reports and our State horticultural board reports are all worthy of careful study.

Fellow fruit growers, are you searching for a higher knowledge of horticultural work? If so, you must study. Success in college comes only to those who labor for it. So it is with the fruit grower. Success bringing with it pleasure, comes most to him who labors in mind as well as in the field.

Let me ask you, are you a member of your State horticultural society? If not, it is your duty to enroll your name at once. It needs your financial as well as moral support; and you need its teachings, influence and power. An amusing incident comes to my mind which clearly illustrates the indifference of many of our fruit growers toward the attendance at horticultural meetings. A few years ago a farmers' institute along horticultural lines was held in our valley in the town of Hood River.

One day while en route to attend one of these meetings, I met a neighbor fruit grower and asked him to go with me. He replied: "Mason, those fellows (meaning our experiment station and agricultural college professors) don't know anything about growing fruit. You had better stay at home and work, and save your time and money." And yet this same fruit grower is using the lime and sulphur spray for scale and fungus and the arsenate of soda spray for the codling moth. Why? Because the experiment stations have established their worth and his neighbors by their acts have conveyed the message to him. And I will venture the assertion that this same fruit grower will use the arsenate of lead spray next season, because some of us have demonstrated its worth as given to us from the many experiment station tests. Do you think this fruit grower is doing his duty? Not in the least. He is floating upon the experience and labors of his fellow fruit growers. He has not given nor is he giving one iota to his fellow fruit growers for that which he has received and is receiving. Again, brother fruit growers, are you a member of the organization, the Northwest Fruit Growers' Association? It, too, needs your moral and financial support, and you are needing its social, educational and financial benefit.

Every fruit grower who attends its meetings is repaid many times the cost of the trip. A year ago this association met in Boise City, Idaho, and our expenses were quite heavy, owing to our distance to travel; but every fruit grower who attended that meeting, will bear me out in affirming that the papers read by Professor L. F. Henderson on fire blight, and Prof. E. D. Ball on codling moth, were worth the cost of the entire trip; and it would be unfair not to say many other

papers read at that convention were of the very highest character; and every fruit grower who did not attend that meeting missed a literary treat and did not do his duty, unless it was not in his power to do so.

He who does not attend our horticultural meetings may be saving a few pennies in cash, but is losing a fortune in knowledge. After a fruit grower has grown his crop and he has begun to place it on the market, then comes the time when duty calls upon him most forcibly.

Do you know that one unscrupulous packer and shipper of fruit can do more toward tearing down a good reputation of your fruits in your district than twenty men can do toward building it up? It is, at this time, when duty calls upon you in unmistakable tones. Co-operation, is the call. It means a more uniform packing of your fruit. It means a better method of disposing of it and it means better prices.

Fellow fruit growers, have you a fruit growers' association in your district? If not, it is your duty to go home and help to organize one at once; it is worth to you, individually and collectively, more than the results of all other efforts combined. It will place you in a better position to meet your fellow fruit grower as a friend. There will be no jealousy between you, each of you will have no secrets to keep in regard to the sale of your crop. Each of you will put the same grade of fruit upon the market in the same condition and for the same price. You will be able to advise each other upon all questions pertaining to the raising, packing and selling of your fruit, without ever arousing any suspicion or ill feeling.

A few years ago one of my neighbors threatened to thresh another neighbor because he would not tell how, when and where and for what price he had sold his apples. Had these two men been in a co-operative association, nothing of the kind would have happened. The equalization of prices for like products, derived only through co-operation, is an angel of peace in any community. Let me again emphasize: The equalization of prices for like products is an angel of peace in any community. Aside from the benefit of your co-operative organization in securing higher prices for your products, it will also secure for you lower prices on what you consume.

In our valley strawberry growers and apple growers are both organized in their respective vocations, and for me to tell you of all the advantages gained by these two organizations would be too great a task at this time.

An organization of fruit growers gives its members a better opportunity to command the attention of the railroad officials in securing better car service and cheaper transportation rates. It commands more respect from the large buyers and places the producer in closer relation to the man at the farther end of that long line of commission men.

Our large buyers will not buy from the individual fruit grower to any great extent. They want the fruit in a larger bulk and especially desire a uniform pack. A large commission firm in Germany told one

Bartlett Pear Tree, Orchard of J. L. Carter, Hood River Oregon

of my neighbors, who visited there last fall, that they would come to Hood River and buy our Newtown apples f. o. b. cars there, if they could be insured not less than 10,000 boxes in the deal. This illustrates the necessity of the fruit growers of any vicinity selling under one management. It is the only way you can remove the many useless commissions between the producer and the consumer.

It is the only way you can secure a uniform packing of your fruit. The improvement in packing of our fruit has been many fold greater than it would have been, had it not our two fruit organizations been in the field acting as instructors in many directions. Our quality of fruit, our system of packing, and our prices obtained have all been improved by these two organizations.

And when I ask you to go home and organize your fruit growers, I do so knowing full well that it is your duty, not only to yourself, but to your fellow fruit growers and to the general reputation of your vicinity as a fruit producing district.

Lest you may not fully realize your duty to become a member of your home organization of fruit growers, let me tell you a few things that we have done in our organizations in Hood River Valley. We have raised the price of our standard varieties of apples, Newtowns and Spitzenbergs, from $1.25 to $2.60 per box, selling our entire crop at one deal f. o. b. cars at Hood River. We are placing upon the markets of the world a better quality of fruit and are packing it in such a uniform and perfect system that we fear no competition. We have built two large warehouses, the last one being 40x100 feet, two stories high, and it is fire proof, water proof and frost proof.

We have bought a $4,000 site for a box factory and intend to erect in the near future a plant on the same. We have forced the price of apple boxes, which was dictated to us by the Northwest Box Association, down from 10½ cents to 8½ cents. We have supplied ourselves with apple paper, in carload lots for the last two years, and have saved our growers several hundred dollars by this act alone. We are now ordering a car load of arsenate of lead spray for next season's work, and in doing so we will save about $500.

And yet, in view of all these acts, we still have a few in our midst who are not with us. Why? Because they are leaning upon our structure and grasping all they can reach without any cost or loss of efforts. These people we will always have with us. Are you one of them? If so, go into your closet and ask yourself candidly: "Am I doing my duty?" You may be able by standing on the outside of the organization to reap some of the financial gain given by it, but you are losing its educational and moral influence. Can you afford to do this? Duty calls; be a man amongst men. Have you no interest in assisting your fellow man, especially if by doing so you assist yourself? In conclusion let me beseech of you to do your duty. Don't depend upon others to labor for you. Try to help carry out your share of life's burdens. Try to help lift yourself and help to lift others. Don't be a

leaner, but a lifter. Ella Wheeler Wilcox, in her poem entitled, "Which Are You?" so beautifully describes this thought:

There are two kinds of people on earth to-day.
Just two kinds of people, no more, I say.
Yes, the two kinds of people on earth I mean
Are the people who lift, and the people who lean.

Wherever you go you will find the world's masses
Are always divided in just these two classes.
And oddly enough you will find, too, I ween,
There is only one lifter to twenty who lean.

In which class are you, are you easing the load
Of overtaxed lifters who toil down the road?
Or, are you a leaner who lets others bear
Your portion of labor and worry and care?

THE GRAPE IN OREGON.

By J. F. BROETJE, of Milwaukie, Oregon.

A paper read at the annual meeting of the Oregon State Horticultural Society, held at Portland, January 9 and 10, 1906.

About twenty or twenty-five years ago there were very few Oregon-grown grapes on the Portland market and they were of a poor quality. When I came here about twenty-four years ago, I went to different nurserymen to inquire about the growing of grapes in Oregon. I was told that there was nothing in it, the climate was not suitable for the grape and it was no use to try. But I did try, and the result was satisfactory. We succeeded in raising fine, big bunches of Concord grapes, sweet and of the fine flavor natural to our native kinds. I remember once, having a talk with some ladies of Portland about our grapes. One of them said: "The California grapes are sweet, but nothing but sweet; they have no flavor." Some years ago, a prominent family in Portland had some visitors from the East. One day, when eating some fine Concord grapes, a gentleman from the East said: "Is it not a pity that you can't grow such delicious grapes here in Oregon?" "Why," the hostess replied, "these are Oregon grapes; they were raised here near Portland." But he would not believe it. Then the lady replied: "We will take you to the place where these grapes come from." And she did. Until a few years ago every fall a carload or more of Concord grapes was brought here from the East, but this has ceased. We grow enough good grapes here to supply the market.

THE KINDS OF GRAPES WE GROW HERE.

In California and in some parts of this State the European or foreign varieties of grapes are grown, and where they do well, they may be

raised with good profit; but in this part of the State the climate is not suitable for them, as foreign varieties are too much affected by mildew, while our native kinds are almost free from it. About fifteen years ago I picked out about thirty of the best of our native varieties of grapes, such as ripen with or before the Concord. I tried them many years. Some were very good and fine, but were not satisfactory in every way; others failed entirely, though they were all kept in good condition. There are only about six kinds that I can recommend as the most satisfactory. They are healthy and productive; sell well, and bring the best prices on the market. They may also be used to make wine of.

The Concord needs no description, as it is known by everybody. They get ripe here about the first of October. The Worden is a black grape, bunch and berries somewhat larger than the Concord. It is ripe about ten days before the Concord. Campbell's Early; black bunches and berries large, of good quality, is ripe about three weeks before the Concord. It keeps a long time and can be left on the vines a long time. Very recommendable. The Eaton, a black grape, bunches and berries very large, quality good, but too soft and the bunches too brittle for shipping; good only for private use. Moore's Early; color black, bunch and berries large, quality good, but with us here has never borne so well as others; is ripe about three weeks before the Concord. The Niagara is the best of the white grapes; bunches large and heavy; berries large and sweet; it ripens about ten days before the Concord, but can be left hanging on the vines till all the other grapes are gone. Moore's Diamond, a white grape, large and of fine quality, but does not bear so well as the Niagara. The Delaware has long and slender vines; bears well; of amber color; bunches and berries medium to small, but very sweet and delicious. All the varieties named do well here, and find a ready sale in the market. I caution everyone not to plant too many kinds and none that have not been fully tried. Grapes do best on high and open ground, and on the south and southwestern slopes of our hills, where it is not too wet. They do not require very rich soil. The ground should be plowed as deep as possible. After the ground has been marked off, holes are dug about three feet in diameter, and a foot and a half to two feet deep. When planting the vines, a little hill is made in the center of the hole, of top soil, around which the roots are spread, and the hole is filled up with top soil. Always set a stake for every vine when planted. The object of planting so deep is to have the roots deep under ground nearer to moisture and that they may not be touched with the plow afterwards when plowed and cultivated. We plant in rows, seven feet apart and eight feet apart in the rows, so it takes about 750 vines to an acre. The first summer, let everything grow on the young vine. The next winter cut all away to one shoot, the strongest, and cut this back to about four buds. In summer, when they grow up, tie the shoots to the stakes. Next winter two wires for trellis are stretched, one two feet above ground, the other two feet above this,

and fastened tightly to strong posts. When pruning, leave one shoot, the strongest, and fasten it to the lower wire. This shoot is to be the main stem of the vine. This summer the shoots will get to the upper wire. No trimming is necessary, but all the shoots that come from below must be kept away. Next winter two canes are left, and tied one to the right, the other to the left side and if long and strong enough, fasten to the upper wire. One or two spurs of two buds each may be left near the canes below, but all the rest are cut away clean. This year you will have some grapes, but do not allow your young vines to bear too much the first time. The year after this the vines ought to be strong enough to bear a full crop. Three or four canes are left now, with six to ten buds, with as many spurs below. The canes are tied to the wires in a slanting direction, so that they form the shape of a fan. The spurs are for bearing canes the year after. Bearing canes are the young shoots from last year's growth. All the shoots that have come from older wood are not good and will not bear.

PROPER PRUNING.

Winter pruning, as well as summer pruning, is very important, as on this depends the success of growing good grapes, and also keeping the vines in good shape and condition. This style of pruning which I explain here is called the renewing system. Every winter, all parts that bore fruit are cut away, and new, young canes take their place. Vines, forty years old, when always properly pruned, are not any larger than when they were at five years old, except that the stem below is much thicker.

SUMMER PRUNING.

The rising sap in spring, which causes the buds to sprout, is forced upward with great pressure, and the greatest pressure is always at the upper ends of the vines, and here is always the strongest growth. Now as soon as long enough, the ends of the young shoots are pinched off, with thumb and finger, leaving one leaf above the upper flower buds. The sprouts below must always develop a little slower, so in a few days you have to go over again, to pinch these, too. The upper sprouts of the spurs are not pinched, and one sprout, at the lower end of the bearing canes, may be left untouched, also, as they may be wanted next spring in case one of the spurs should fail. In a short time the laterals or sideshoots opposite the young fruit will push out. These must not be pulled off, but have to be pinched, leaving one leaf again. If the vines are not vigorous and strong, more leaves may be left. It may be necessary, sometimes, to shorten the laterals again, should the vines become too bushy. The leaves opposite the bunches are necessary, to help to feed the young fruit. The food that nourishes the plants and fruit is first prepared in the leaves, which draw the material partly from the air and partly by the roots from the earth. In order to have good grapes it is necessary that our vines have plenty of good, healthy

foliage. Sometimes in July the bearing canes for next year should be cut off at the ends, also all rank growth should be checked. All the sprouts that appear on the stem below and on the older wood must be kept away clean, except where a spur is wanted. I am sometimes told by certain grape growers, "We don't take so much trouble to pinch and trim our vines in summer, when they get too bushy; we take the sickle, and trim them off, and we have just as good grapes." No doubt you have. But how are your bearing canes for next year? When the growth at the upper part of the vines is not checked in time the lower shoots will not develop, and when you prune next winter you will find very few good bearing canes below, and you have to go farther up, and off, from the main stem; every year a little farther, till you get a long way off, and it will be necessary for you sometimes to cut all off, and lose a year's or two years' crop. I have seen Concord grape vines that were overlapping each other to the second and third vine. If the grape vines are pruned in summer the way I have explained, the grapes will always be of the best quality, and get ripe in due time. I often notice in summer a big mistake made by some people who believe that the sun must shine on the grapes to get them ripe. I was once called to a little vineyard of about fifty Concord grape vines. The owner said his grapes would not get ripe, and the berries were shriveling up. When I got there I found that the leaves were very much thinned out, in order that the sun might shine on the grapes to ripen them, as he was told to do by some one who knew (?) all about grapes. But they never got ripe. The value of the leaves and their design, is not well understood by a great many people. I want to explain here a little about this. What are shrubs, trees and all kinds of plants created for? Why do they grow. The answer is, to bring forth fruit and seed for men and beast and for the perpetuation of their kinds. It is their instinct to bear fruit. When we go in the garden or orchard we find everything prepared for a start. There are millions of buds which were grown there last summer and fall, waiting for spring weather. As soon as warmer days come, the roots begin to force upward into the stem the sap, in which is dissolved matter necessary for the growth of the plants. This sap is pressed upward with great force and soon pushes out the buds. A great event in nature is now about to take place—a big wedding. Thousands and thousands of tiny cradles are forming in the buds, which increase in size, and a beautiful decoration is formed about each one. The trees and shrubs are in full bloom. But, why all these attractive colors? It is to invite the guests to the wedding, where a table has been spread for them with sweets. Here they come—bees, butterflies and all kinds of insects, and all help themselves, and while doing so, give essential aid in the fertilization of the flowers.

Then, the young leaves appear and start upon the business of supplying the growing fruit and the whole plant with food. From the dissolved mineral matter which comes from the earth through the roots in the sap and from the carbonic acid gas which the leaves take out of

the air, the requisites for the growth of plant and fruit are formed, and sent back from the leaves to do their work. The carbonic acid gas enters the leaves through very small openings or breathing places. It comes in contact in the cells of the leaves with chlorophyll and when the leaves are exposed to the direct rays of the sun a chemical process takes place which results in the formation of starch, and this starch, with the mineral matters brought up from the soil and separated from excess of water in the leaves, build up the plant, root and top, and enable it to develop and ripen its crop of fruit.

THE MULCH METHOD OF ORCHARDING.

There have been so many questions about "mulching" of late that we print here the substance of a paper read by H. W. Collingwood before the New York State Fruit Growers' Association at Fredonia, N. Y.:

WHAT IT MEANS.

What do I mean by mulching a young tree? I plant trees either in sod or plowed ground, as is most convenient, usually in sod. I dig a small hole and closely prune both roots and top of the tree, then I pack the tree hard in the little hole. The sod which is dug out is put in the hole upside down, and packed down hard around the roots of the tree. As soon as possible after planting, a pile of coarse mulch, straw, weeds, grass, forest weeds or trash is thrown close around the tree. As grass or weeds which grow in that field are cut the crop is raked and piled around the tree, thus having a mass of decaying vegetable matter there all the time. In one peach orchard we have cut the grass and hauled it out for hay, then we gathered weeds and trash of all sorts and threw that around the trees. This method, however, is not what I call the mulch system, as when properly carried out all the grass which grew in the field should be cut and piled like a young hay stack around the foot of the trees. I imagine that 75 per cent of the reported failures of the mulch system, especially for young trees, have been where the grass was hauled away from the orchard. I planted one orchard in an uncleared field and cut brush, cedars, briars and sweet-fern bushes, which were piled around the young trees. Under these different conditions the growth of the young trees has ranged all the way from poor to excellent, depending upon the amount of mulching material we had put around the trees, other treatment being equal. Where we have been able to obtain sufficient mulch material the growth with us has been quite equal to well-cultivated trees. At the Ohio station the growth of the mulched trees was ahead of those cultivated or planted in clover crops. These mulched trees also came into bearing earlier. That appears to be true of our own trees. I also notice that the

mulched trees, not cultivated, grow into a different shape from those that are thoroughly tilled. They head closer to the ground and make a spreading shape, more like a bush than a tree, which in our country is desirable on account of the scale and the high winds which sway the trees. Last year I felt prepared to say that while the mulch will give good results with apple, it is not so useful for peach. This year, however, the results with me have been excellent, fully equal to those of apple. I have not obtained equally good results with pear on my soil. My observation is that when the young trees are well mulched the peach borer seems to lay its eggs higher up on the trees, where the insects are easily found. On the other hand, the apple borer seems to be worse under a thick mulch, and mice also nest in or under it. Where the trees are wrapped at the beginning with wire cloth there is little danger from these pests. A number of failures in mulching have been reported, and in most cases I found on investigation that a mere handful of grass or weeds had been put around the tree, not enough, under any circumstances, to keep the soil cool and moist. It requires nearly the equivalent of a small hay cock to do the job properly. Whenever we have been able to keep a thick layer of mulch around the young trees the growth has been fully equal to that of trees thoroughly cultivated, and in some cases superior; in fact I think there can be no question about this, the great trouble being to find the needed mulch material.

THE ROOT SYSTEM.

It has long been said that when a tree is mulched the feeding roots all form at the surface and even work up into the mulch itself. From this it was argued that if for any reason the mulch is removed, if fire runs through the orchard, or if the soil is plowed, the orchard would be ruined, as these surface-feeding roots will be destroyed. I have never believed this, although unable to prove it, but the Ohio Experiment Station seems to have shown the falsity of the argument. At that station blocks of soil a foot deep were taken from under both mulched and cultivated trees, and the roots were washed out and carefully examined to see where they went to. It was found that the network of rootlets, which we find close up under the mulch is not, by any means, the whole story, but only the upper story. Below the mulch the roots were as numerous and as deep as they were in the cultivated soil. In other words, the mulched trees had a more extensive root system than those that were cultivated. You might take the mulch away or plow the ground, and still have nearly as good a set of roots as in the cultivated tree. I think that anyone who will fork away a thick pile of grass or weeds from around the base of a tree will easily see why and how the Ohio station is right. You will find underneath that mulch the soil is moist and cool, just exactly as it is under a door or wide plank that lies on the ground. Countless earthworms and other insects are found at work under the mulch, which had killed out all vegetation as thoroughly as cultivation does. There are very few cultivators who

work their soil more thoroughly during the season than the earthworm works under a pile of grass or weeds. The ground is honeycombed and the soil is thoroughly worked over, brought to the top and back again by the insects. This lets the air into the soil, and by digging down into it you can easily see that the root system is deeper instead of being at the surface. I have every reason to believe that one grat advantage of sowing red clover with timothy is that the deep roots of the clover, when they decay, open passages down deep into the subsoil, while the timothy roots follow. My own mulched trees appear to make their best growth later in the season than those that are cultivated, and yet I notice that they always harden up the wood and are seldom, if ever, injured by frost.

CROWBAR PLANTING.

I am very confident that the root system of a tree can be deepened by cutting the roots closely, to short stubs, and planting in small holes with the dirt packed hard around the roots. I will go so far as to say that this system of planting seems to be an essential part in successful sod or mulch culture, more so, I think, than where the trees are to be cultivated. We have also found that the use of lime seems to be of special benefit in connection with a thick rotting mulch. If a man were to start out to grow trees in this way by simply sticking them into the sod, without mulch enough to keep the ground moist, I should think it would be the worst thing he could possibly do. He would do much better to plow and cultivate those trees, or never plant them out. To make a fair comparison with cultivated trees we must, as I have said, use what amounts to a small haystack around each tree. I don't believe that the mulch system is adapted to all conditions. There are, without doubt, some sections where thorough culture is more sensible. You cannot lay down any cast-iron rules for growing a tree, because soil, climate conditions and varieties of trees all differ. On some level, naturally moist lands, which are naturally grass lands, I can understand why sod, not mulch, would pay better than cultivation, especially in a very wet season. The constantly growing grass would take the surplus water out of the soil, as I believe the trouble with such soils is not that there is need of more water, but that there is too much. When, however, the drought comes, such soil, left by itself, appeared to be the worst possible place for trees to grow, because it bakes up as hard as a brick. I have found that such soils, especially where they are close to rocks, are greatly helped by a thick mulch. Therefore, in a wet season I would let the grass grow, while in a dry time I would cut it and pile it around the trees. I think the best success with the mulch system will be found where we can start the tree with roots closely pruned and keep it mulched.

ORCHARDS ON ROUGH LAND.

This mulch method can be used to good advantage on the rough or steep lands where cultivation would be out of the question. The trouble

Individual Exhibit, Hood River Fruit Fair, 1906

is to find the mulch. In parts of Ohio and West Virginia fruit growers in the hill lands are buying straw from the farmers who live on the level bottom. In my own case I have used weeds, grass, rotten sawdust, brush and anything that will finally rot, with the aid of lime around the trees. It may be asked why go to this rough land for fruit growing, when our best results thus far have been obtained on the more level rich land. In my judgment these rough hills are to produce the fruit for future millions. When this mulch method is more generally understood these rough hills can be, and will be, utilized as a business proposition. Thus far it has been impossible to apply to these hills the methods which have made fruit growing a large business. We shall learn in the near future that we must adapt our culture to the conditions of the land. Many of our present successful orchards are on rich level land that would pay better in other crops. I also believe that in the course of time insects and fungus diseases will accumulate so on these level lands that the business will be far more expensive and hazardous. To clean new lands on the hills are cheap, because their possibilities in fruit productions have never been demonstrated. With this new system properly worked out, the hill lands are destined to revolutionize fruit growing. This will become very evident within a few years, when the beautiful fruit comes rolling down the hill out of the young orchards that are now being started. Above all else let us contradict the impression that this mulch system of raising fruit is of necessity a lazy man's method. The lazy man has no opportunity in agriculture or fruit growing. This mulch method is within the reach of a man with moderate means, or a man who, from one reason or another, cannot do the hardest physical labor. It is also within the reach, for example, of a woman left with no property save a rough farm. With her children, willing to work, and a fair amount of capital with which to buy trees and a spraying outfit and similar tools, such a woman can, by carefully following this method, develop an excellent orchard, not of large overgrown trees, but of stocky low-down fellows within the reach of the nozzle, and capable of producing first-class fruit. In fact, I think this mulch method on rough land will be one of the ways in which the small family or the man with moderate means will be able to keep up with the big fellows, who, unconsciously, are crowding the little fellows out of the race.

MULCH TALK FROM J. H. HALE.

As is well known, Mr. Hale believes in the most thorough and persistent cultivation of orchards. After reading the above paper, he says:

I think it is the most sensible presentation to the case that you or anyone else ever made, and you get right down to facts when you say it is a small haystack that is required around each tree to do the trick satisfactorily. Now the trouble on most uphill, rocky farms is going

to be to get the material to make that small haystack. There is hardly a farm in the eastern country that can scratch up material enough of that kind to make the "year's bedding" for the cattle, horses and pigs, although, of course, there is a lot of rougher material than ordinary bedding that can be used for the mulching. You would find it a pretty serious business proposition on the average hill farm. I am more inclined towards culture than ever before, although I can agree that in rare instances the mulch scheme could be worked out satisfactorily. Just now we are picking stones and getting ready to subdue more thoroughly with the plow that rough hill lot that I thought two years ago might be handled by a sort of cross between a grub hoe and the mulch system. We are having to move a good many thousand tons of stones to be able to beat the situation, but I am sure in the end I can make it more profitable than to attempt to mulch it.

THE HOME ORCHARD.

Mr. Asa Holaday, proprietor of the Monte Vista Nursery, Scappoose, Oregon, read the following paper at the annual meeting of the Oregon State Horticultural Society, 1906:

Upon first consideration, we are apt to think that the planter of the small orchard for home use does not cut much figure in this tree-planting world, but I can assure you, if we had statistics at hand, we would find that the nurseryman would have to curtail his planting considerably, if it were not for the small planter.

We also find the demand for fruit is lessened to an important extent by the home orchardist in and about our small towns and cities. Especially is this so with early fruits, such as cherries, plums, etc., on this coast.

The planter of a small orchard is apt to make the same mistake as he who plants a large one, that of planting too many varieties, and, I might add, too many trees. We have an example in the numerous orchards planted years ago. Usually they are filled with worthless varities and serve as breeding grounds for insect pests, which make life miserable for the more careful grower across the way. Without the experience it is hard to realize just about how many trees it will take to supply an ordinary family. I have often heard the remark made that, "I am just going to plant a small orchard for family use and want fifty to one hundred trees." Then follows the selection of twenty-five to fifty varieties for home use. If the trees reach the bearing age, there will not be enough of one kind to sell. Then the owner is apt to think it will not pay to care for so many trees, so will neglect them all. If he had planted one-half or two-thirds of the trees in one variety he could have sold his surplus fruit, which would have encouraged him to have taken care of the balance.

About fifteen years ago a man came to me to buy a bill of trees. He wanted about seventy-five for a family orchard and as he was a single

man I advised him to take about fifty of the apple trees in one variety. He owned forty acres of land and in time sold it. This year the present owner sold enough apples off those fifty trees to pay the price of the land. About the same time another man bought fifty trees consisting of thirty-seven varieties, and it is needless to say that the sales of fruit did not pay for his land. A conservative estimate of the yield of a seven to ten-year-old tree would be one hundred to three hundred pounds. We can estimate from this how many trees it would take to supply a family. I would think ten to fifteen trees would do it, if well taken care of. In my opinion it would be better to set this number of trees and invest in a small bucket spray pump, than it would to set five times the number of trees and neglect them, which so often happens. However, in planting an orchard of fifty to one hundred trees a small number could be planted in mixed varieties, while the balance could be selected largely of one or two varieties suited to the locality, with the idea in view of selling the surplus. Perhaps apples would be suitable in one place, while cherries or some other kind of fruit would be better adapted to another locality.

There are many tree planters in cities and towns who have but a small plat of ground, and can set but perhaps three to six trees. In that case unless I had the time and inclination to use the spray pump continuously, I would eliminate the apple from my list, and plant of other fruits the codling moth did not trouble. By selecting a good seedling stock, three or four varieties of cherries can be grown on one tree, in this way succession of varieties can be had. In the same way plums, pears and other fruits can be grown and in time a few trees be made to produce an abundance of fruit for a small family.

As to varieties, this will depend largely upon the locality. In apples, the Yellow Transparent and Duchess of Oldenburg for summer, the Gravenstein and King of Tompkins County for fall, and the Northern Spy, Jonathan, Spitzenberg, Grimes Golden and Yellow Newtown Pippin for winter would be a good list to select from.

Bartlett, Fall Butter, D'Anjou, Clairgeau, and Winter Nellis pears would give succession of varieties.

Abundance, Peach, Washington and Blue Damson plums, Willamette, Italian, and Silver prunes would probably prove a satisfactory selection.

In cherries, Governor Wood, Royal Ann, Bing, and Lambert for sweet kinds, while Early Richmond, English Morello and Late Duke will answer for sour varieties. I consider Lambert and Late Duke especially valuable on account of lateness as they usually escape the summer rains in this locality, thereby avoiding cracking.

Peaches and apricots I leave out of the list as I have little success in growing them where I live, and do not know much about them.

After the tree is once planted do not neglect to care for it, as thereby comes great pleasure as well as profit.

What pleasure there is in the thought of not only being the grower but also the consumer. The home orchardist has solved the great problem that has vexed the commercial orchardist for years, that of reach-

ing the consumer direct, thereby eliminating those three great believers in sharing the profits, the railroad company, the commission merchant, and the retail man. The thought of this almost persuades me to become my own consumer.

THE CHERRY IN OREGON.

The following is the paper read by Mr. M. McDonald, president of the Oregon Nursery Company, at the summer meeting of the Oregon State Horticultural Society, Salem, 1906:

In this magnificent display we have an object lesson of what the Oregon cherry is in reality; including, as it does, varieties that originated in other states and countries as well as those of local origin.

There seems to be no question but that all classes and varieties of cherries find here in the State of Oregon, and especially in our fair Willamette Valley, a soil and climate congenial and well adapted to bringing this noble fruit to its highest state of perfection. Here thrives the Napoleon Bigarreau (our Royal Ann) supposed to be a native of France, flourishing as it does in no other country. There are also the Black Tartarian from Russia; Governor Wood from Ohio and the Deacon from California, besides the numerous other American and foreign varieties in Hearts, Bigarreaus, Dukes, and Morellos, all of which are admirably adapted to conditions on the Pacific Coast.

It is not, however, to the varieties of foreign origin which have adapted themselves so well to our environment that I wish to particularly refer, but rather to the Oregon cherry—varieties which have originated in this State as the progeny of the varieties transported across the plains by early settlers, and which by their adaptability to either home use or sale in foreign markets by far surpass any of the older varieties.

The history of the cherry in Oregon covers but a moment of time as compared with its history since the time when a Roman general introduced it in Italy from Asia in the year 69 B. C. Yet, in the short space of time since the cherry was first introduced in the old Oregon Country the varieties which have originated here have practically revolutionized the cherry industry, making it possible for the millions of people living in Eastern cities along the Atlantic Coast to feast upon these luscious varieties of Oregon origination and production. I refer particularly to the Lambert, Bing and Black Republican, the varieties of which have made it possible for the cherry to be grown on the Pacific Coast and transported in good condition to the cities on the Atlantic.

Oregon may feel justly proud of its record in the origination of new varieties of cherries, and, I say, all honor to those early pioneers who not only braved the trials and hardships of early pioneer life, but who laid the foundation of this new and grander horticulture upon which we of the present are just entering. Those now engaged in horticultural pursuits might well afford to erect a monument to the memory of such men as Lewelling and Lambert as an incentive to others to emulate them in

the origination of still greater varieties, although the fruits these men have originated will be a more lasting monument to their memory than can be erected by man.

In these improved varieties which we have before us we see what has been accomplished in the improvement of the cherry since the first trees began to bear in Oregon, thus giving us some idea of what might be done to still further improve the commercial qualities of this fruit. Results obtained and improvements made in size and carrying qualities, seen in the Lambert, Bing and Black Republican and Hoskins, surely establish the fact that here in the Willamette Valley conditions are the most favorable in the world for wedding the blossoms; and here the progeny of the mating include varieties superior in size, flavor and all other qualities desired in the commercial cherry to-day.

Notwithstanding our past achievements in the origination of new cherries, there is still room for improvement, and not until Oregon produces a variety as large and fine flavored as the Lambert or Bing with the color and all other good qualities of the Royal Ann, and ripening from two to three weeks later than that variety, shall we approach the high standard we should all be looking for. The Royal Ann stands today as the best and in fact the only variety used extensively for canning and for meeting the demands of the manufacturers who place Maraschino cherries upon the market for which use the highest prices are paid for perfect fruit. But this variety, ripening as it does in most years, just at the close of the rainy season, is too often damaged by climatic conditions to be used for these special purposes, and the profit of a good crop is too often dissipated by a late rain during its ripening time.

A few days ago I read an item in one of the newspapers in which the statement was made that the entire crop of Royal Ann cherries growing in the La Grande, Union and Cove districts had been contracted for by a cannery for a term of five years at four cents per pound. To be sure, four cents per pound is not a very high price, but the fact that a cannery is willing to take its chances on the whole crop of the district for a term of five years is proof of the value of this variety for canning purposes when grown in a section where there is no danger of injury from rains at the time of ripening.

In no section of the State does the cherry attain a higher degree of perfection than in the Willamette Valley, nor is any section of the whole State more free from storms during the month of July than is this valley. This being the case, why not originate a variety, or varieties, to follow the ripening season of the Lambert, filling all the requirements of the shipper, the canner and the Maraschino manufacturer? That this can be accomplished appears quite feasible for the Lambert—the largest and best variety yet introduced—has extended the cherry season at least two weeks beyond that of the Royal Ann, showing that the season of ripening can be extended by the origination of new varieties. Near the city of Olympia, in the State of Washington, there is growing and ripening its fruit a variety of the Heart and Bigarreau class which

ripens its fruit during the latter part of September and the first of October, proving conclusively that the time of ripening of the cherry is limited only by the seasons of the year, and that it is within the possibilities that we may originate new varieties of cherries ripening continously throughout the summer season.

With the object of reaching this higher standard in perfection in cherries it might be within the province of this society to appoint a committee whose business it would be to formulate a standard of the requirements for the Oregon cherry of the future, in order to stimulate the originators of new varieties in approaching this standard.

Perhaps the day may come when this society will have a fund at its disposal for the purpose of rewarding with a medal the originators of new varieties, bestowing the same as a token of appreciation of their efforts toward the improvement of our fruits.

In conclusion, allow me to look forward a few years and describe to you the Oregon cherry of the future: A tree, hardy, vigorous and healthy, enduring in both wood and blossom bud the changes of temperature of our worst seasons; a fruit larger and even more beautiful than any growing to-day; delicious in flavor yet sufficiently firm in flesh to stand in good condition its shipment to our most distant markets, and ripening at a season of the year when there is no danger of injury from storms or rain. Such a cherry can be shipped to foreign markets, sold to local canneries or be used for Maraschino, and a price demanded commensurate with the efforts put forth in producing and bringing to perfection one of the finest fruits God has given for the use of man.

THE COMMERCIAL SIDE OF THE CHERRY.

Mr. H. S. Gile, the well-known fruit shipper of Salem, read the following paper on "The Commercial Side of the Cherry," at the summer meeting of the Oregon State Horticultural Society, Salem, 1903:

What I do not know concerning the Oregon cherry (or the cherry now being produced in Oregon), from a packer's standpoint, would fill an immense volume. I am only constrained to stand up and be seen before this meeting because of the importunity of the gentlemen in charge of the program.

Soon after coming to Oregon, something more than sixteen years ago, I became interested in the wonderful tales I heard concerning the big cherries of the State and resolved to make Oregon famous by advertising her big red cherries. We spent a lot of money in getting out some colored work representing a lad (presumably an Oregonian, as he had large web-feet). I have since learned that this type never belonged to Oregon; (he certainly never belong further south than Seattle) in the act of taking his second bite from a luscious big red cherry, the first bite having only made a start; much as a youngster would attack a step-mother's slice of bread and butter. Well, this took to some extent, and we continued to ship some cherries for several seasons, but the profit side of the transaction was never very encouraging and we soon

learned by experience what we might have gathered from a study of geography, namely, that the Willamette Valley is hemmed in and naturally so circumscribed that there is no large near-by shipping outlet for her small fruits. I mean that almost every locality within a reasonable time from any point in the valley, is almost equally well supplied with about the same varieties as are produced here, so that no great business can be built up in the local, less than carload shipping of small fruits. We then resolved that the only thing to do was to go in for carload shipments. We have had our experience in that line, some of it mighty costly, and have for several seasons about abandoned any effort to operate in anything except the cured products; we might except apples and late pears as we annually try to handle a few cars of this fruit.

Now, then, I assured the gentlemen in charge of this program that I would be likely to say something of this kind if I got started for the "truth will out." However, I do not wish to discourage in the least any grower, packer, or shipper of Oregon small fruit. Because I am not an enthusiast along this line does not necessarily make it impossible for some other man to make a great success out of it. My experience is that the valley cherry, of whatever kind, the valley apple, and valley pear, especially the Bartlett, will not stand up for long distance shipment as the same varieties of fruit evidently do stand, when grown in certain other sections of the State and elsewhere. As I said in the beginning, I do not know about these things, but my experience has not been exhilarating, and it remains for other men to take up the work if they choose and profit by the experience and failures of their predecessors.

I have never been called a pessimist and I firmly believe that it may be possible to so improve the Oregon-grown fruits by cultivation and care that more knowledge might be gained and applied concerning varieties and their habits and only the best fruit selected and used and then, with greater care in the proper picking, handling, and packing, equally good results could be obtained as are secured in California, or elsewhere. I will not admit that our cherry is second to those grown anywhere in the wide world. How could I in the midst of this marvelous display; I doubt if this show of cherries could be surpassed and, I fancy, hardly equalled anywhere in the world. But the chief reason for past failures is not so much the method of handling the cherry, but because there is not the quantity in any given district to make it an object for packers and merchants to give the matter the attention which it deserves, and which it would receive if there were many thousand times more cherries; hence, packers have been content to let the canners and Maraschino people take the fruit year after year; and the latter have been, and are, the price-makers.

Cherries for long distance shipment must be packed properly, but before that they must be carefully picked, before they are fully ripe. Every fruit must be handled individually and should be carefully taken from the trees, handling each fruit by the stem and never severing the fruit from the stem. If possible, they should be picked when cool, or

cooled immediately after picking. They should then be packed by skillful packers right in the orchard and always kept cool and as soon as possible after being thus picked and packed should be delivered to the refrigerator car, which should be thoroughly cooled and in waiting to receive the load. The cherries should be packed in the regular 10-pound flat box for long distance shipment. The box being so designed that when stacked with ventilation space, stripped and braced, the cool air easily penetrates to every fruit. The carton made to fit these boxes makes a still better pack, though somewhat more expensive, and is in favor with the retailers because of the lack of loss in dealing them out.

I need say little concerning the method of packing; you have here a practical demonstration of the work. The fruit should be laid so as to avoid any shifting or moving in the box, and the box must be fitted. Don't fear to press the bottom down upon the fruit firmly; there is more danger in slack filling and shifting than in squeezing of the bottom fruits.

Now, then, if you will contrast this method with the manner in which we have in the past literally "clawed" our fruit from the trees—much of it over-ripe to begin with—and then think of the way it has been dumped into bushel boxes, wash boilers, or any other handy receptacle and hauled to town, perhaps in a wagon without springs, you will be able to find some excuse for the non-keeping quality of the Oregon cherry, and you may, in a very large measure, account for our past unfortunate experiences. These conditions may be well applied to all of the other fruits which are usually packed and shipped green.

We have never been half careful enough in the handling of our green pears; because they are green and hard does not indicate that they can not be injured by unreasonable handling.

I am not willing to concede that we have not as bright and keen business men here as may be found in any other State, and I believe that if the cherry was to be found here in sufficient quantities so that the packer could afford to send his packing crews into the country and gather and pack the fruit in a proper manner and could get it in such quantities that he could load a car or two every two or three days there would be no lack of merchants to buy the crop of cherries on the trees at very profitable prices.

Concerning varieties for packing purposes and fresh shipment, I should say the Bing, the Lambert and the Royal Ann are the three best cherries we may expect to do business with, on account of their size. If, for any reason, the market does not justify shipment, these varieties are always in favor with the canners, and perhaps these varieties might also be improved upon. Perhaps the Royal Ann could be brought down to ripen a bit later to avoid the rain which we frequently have about the maturing time; this is one great and good characteristic of the Lambert and Bing.

The size and appearance is the attractive feature with all of them. Much depends upon the packing of the fruit of any kind; "handsomely packed means well sold." Appearance is everything.

THE DUTIES OF COUNTY FRUIT INSPECTORS.

Mr. E. C. Armstrong, county fruit inspector for Marion and Linn counties, read the following paper on "The Duties of County Fruit Inspector," at the summer meeting of the Oregon State Horticultural Society, Salem, 1906:

In opening this subject for discussion, I will not attempt to read much of a paper, but simply suggest a few thoughts that may lead to a free discussion of the subject, so that farmers, fruit growers and inspectors may have a better and more mutual understanding, that we may better work together for the benefit of each other and the good of the community and State.

No inspector can stand alone in this work. If he is successful in any degree he must have the moral support and co-operation of those in the community who are interested in the work. It might be well, and I suppose it will be expected, that I quote some extracts from the horticultural law that refers to the duties of the county inspector.

The last session of the Legislature passed a law, from which I will quote a few items:

Section 1. That upon a petition of not less than twenty-five residents and fruit growers of any county in this State, the county court of said county shall appoint a county inspector, whose duty it shall be to inspect the apple and other fruit orchards of said county and enforce the laws now in force and that may be hereafter in force in the State applicable to the fruit industry and to the growing, handling, and selling of fruit, fruit trees and other nursery stock.

Section 2. The county inspector shall perform his duties under the general supervision of the State District Commissioner, to whom he shall make reports in the manner prescribed by the State Board of Horticulture.

Section 7. It shall be the duty of the several members of the Board and of the secretary or the county inspectors under their director, whenever they shall deem it necessary, to cause an inspection to be made of any orchards, nurseries, plants, vegetables, vines, or any fruit packing house, storeroom, salesroom, or any other place within their district, and if found infested with any pests, diseases or fungus growth, injurious to fruits, plants, vegetables, trees or vines, or their eggs or larvae liable to spread to other places or localities, or of such nature to be a public danger, they shall notify the owner or owners or persons in charge of, or in possession of such articles, things or places, that the same are so infested, and shall require said persons to eradicate or destroy said insects or pests, etc., within a certain time, to be specified in said notice.

It might be interesting to quote a few more extracts from the law that relates more to the grower:

Section 1 of a law entitled an act to protect the fruit and hop industry of Oregon:

It shall hereafter be unlawful for any person, firm or corporation, owning or operating any nursery, fruit orchard of any kind, hop yard, flower garden, or ornamental trees, to throw any cuttings or prunings, from any fruit trees, nursery stock, ornamental trees or hop vines, into any public road, highway, lane, field, or other enclosure, or into any water course of any kind; but shall destroy such cuttings or prunings by fire, within thirty days from the time such cuttings or prunings are made.

Section 2. It shall hereafter be the duty of any person, firm, or corporation owning or operating any such nursery, fruit orchard, hop yard, flower garden, or ornamental trees, and knowing such to be infected with any kind of insects, pests, or disease, to immediately spray or destroy the same in such manner as the fruit commissioner of his district may direct.

Section 5. It shall be unlawful for any person, firm, or corporation, to import or sell any infested or diseased fruit of any kind in the State of Oregon.

There is another section requiring merchants selling spray material to guarantee its quality and per cent of purity. Another prohibiting any person or firm from packing to ship any diseased plants, fruits, or vegetables. Then section 7 says:

Any person, firm, or corporation violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than twenty-five dollars nor more than one hundred.

Possibly this is enough of the law. It will be seen by these extracts that the inspector is working under the general supervision of the district commissioner. That it is his duty to inspect the orchards, packing houses and storerooms, to guard the markets, etc., or, in other words, to enforce the law as it now stands or may in the future be enacted. This is the legal side of the subject, that any one may learn if he wants to, or may learn by actual experience if he is too negligent or stubborn to try.

But there are other duties of the inspector, to which I wish to refer that are not written in the law. In my experience as inspector I find many people who do not know what to do in order to properly clean up and care for their orchards. In some communities where fruit growing is not carried on except for family use I find there is no one who knows anything about spraying or caring for their trees. This does not mean that these communities are not intelligent. But it does mean that in the past this has been out of their line of business.

In years past fruits of all kinds have grown to perfection with but little care and attention. This has created a habit of carelessness and neglect, the result of which is manifest, especially through the Willamette Valley.

But of late years we have scale, aphis, codling moth, caterpillars and fungus diseases too numerous to mention.

These changed conditions have made it necessary to employ different methods of action. These farmers who in the past have had fruit

abundantly without effort or expense must now take up the spray pump, the pruning saw and the cultivator, or go without fruit.

But they don't know how. The inspector must teach them how to spray, what to spray with, how to prepare it, and when and how to use it.

He must also give suggestions in regard to proper pruning, and cultivating.

Farmers generally are not only willing but anxious to learn these things.

And the inspector will find that they will generally co-operate with him in his work if he will go at them with a disposition to help rather than to domineer. Occasionally we will find a man who is too stubborn and contrary to do that which is right. Such a man has to be handled with the iron hand of the law. But I am thankful to say that the Oregon farmers are so intelligent, honorable and fair minded that we seldom find one of this class.

All conceivable kinds of questions are asked an inspector. Some of them are very foolish, of course, but he is supposed to be as well informed as possible on all branches of horticultural work, and answer them as intelligently as possible. It is his duty to try to prevent ill feeling between neighbors.

When A reports that B has an orchard that is infested with all imaginable kinds of insects and diseases (although he may have a worse one himself) the inspector must take the responsibility himself and tell both parties that it is his duty to visit all the orchards, whether they are complained of or not, and find out their true condition and act on his own judgment.

It is his duty to work to the interests of the fruit grower and farmer in all matters pertaining to horticulture.

Help to protect them what he can from unscrupulous nurserymen, and dealers in patent spray materials.

In my experience I have had much satisfaction in helping to get the proper spray material of the different kinds at reasonable prices. In this and many other ways, if the inspector is constantly studying the needs of the growers and trying to be helpful, he can save to the farmers and fruit growers of his county more money than it takes to pay his salary.

I find it necessary to get acquainted with the grocerymen and druggists, who handle spray material, and tell them what the fruit growers will need at different times in the year, and get their co-operation in the matter of furnishing spray materials of the proper kinds at the right prices. It is also a good plan to leave spray formulas with these different dealers so they can intelligently give instruction to the purchaser.

And so I might go on enumerating the duties of the county inspector, but I think for the present I have said enough.

PRESIDENT'S ANNUAL ADDRESS.

Annual meeting of the Oregon State Horticultural Society, January, 1906.

Dr. J. H. Cardwell then delivered his annual address as president of the society, as follows:

In behalf of our Portland horticulturists, I tender you a cordial welcome. We are glad to have you with us. Your executive committee, deferring to the greater attraction, the Lewis and Clark Exposition, deemed it inexpedient to attempt to interest you in the contemplated summer meeting of the society. The time was perhaps more profitably employed in the Horticultural Building.

The season was one of great interest in the horticultural display. This was the surprise and the admiration of visitors, and did much to advertise, the very enviable reputation Oregon has established as a fruit-producing State, and will undoubtedly influence many fruit growers and home seekers to return to us, and become neighbors and citizens. Professor Van Deman, formerly head of the Government Department of Pomology, than whom there is no more competent authority, said to me, "There are only two or three districts in the United States that could presume to rival you in the size and quality of your fruits, notably the apple, prune, and cherry." Professor Van Deman mentioned the Ozark Mountains as one of these districts in production of the apple and peach, and I believe a district in South Carolina was mentioned, especially, for fine peaches, apples, and small fruits; though he did not think these districts produced finer or showier fruits than we were then displaying on exhibition in the Horticultural Building. The old story—you have heard it—"Our exhibit, the Oregon exhibit, as always, took a large majorty of the prizes."

Referring to the State Board of Horticulture: In view of the inadequacy of the law, the insufficiency of the State appropriation to meet the requirements of the Commission, to properly do the work of orchard inspection over so large an area, the Board prepared amendments to the law which were passed by the last Legislature, creating in addition to the Board, county inspectors on petition of local fruit growers. This provision proved a wise and timely adjunct to the efficiency of this Board. The work is being inaugurated with great promise to the fruit industry of the State; not too soon for the urgent demands of this interest. Notably, the mild, moist climate of Western Oregon, so favorable to fungous growths and insect pests, calls for a better understanding of the situation, intelligent inspection, and thorough work—a more rigid enforcement of the law.

Since the introduction of the insect pests known to Eastern States and the Orient, annual spraying is no longer a problem, but a necessity;

clean trees and clean fruit is now the order. No longer can the worthless disease-infected old orchards of the careless, thriftless grower be allowed to menace the clean orchards of the careful, painstaking neighbors. The county may now take charge of these old orchards and do the right thing at the expense of the owners. Sprays and spraying outfits are so improved and perfected that this is no longer a difficult or very expensive undertaking.

We are learning and have learned some things. In fruit commerce, conditions, tastes and fashions have materially changed within a decade. The situation seems to demand serious consideration. Rapid transit by steam and rail, refrigeration, improved packages and appliances for shipment, the great extension of the fruit area in tropical countries, our growing trade relations with these countries, now placing the green fruits of the islands of the sea and the four quarters of the earth on the fruit stands of a whole continent—carted and shouted through the streets in country and city. The fig, the date, the orange, the lemon, the banana, pineapple, grapes, mangoes, and queer, unnameable fruits, edible, these are always with us, and largely consumed by the populace. In their season from the south of us, the early peach, the cherry, the grape and all the small fruits known to civilization; and the consumption in green fruits. Admitted, that sometimes in their season we may compete at home and abroad successfully with our superior green fruits, and we may send three-and-a-half and four-tier apples to the Orient, to England, France, Germany, and other countries, and the growers may reap a golden harvest; all this—but what of the greatly decreased and decreasing consumption of our dried products, even reaching canned fruits. Verily, a serious condition—a problem—what shall we do about it? The dried apple, and peach, not long ago the world's great staples, now rarely called for; culinary art, and gustatory taste call for green fruits. Green fruits have taken their places. The green apple, banana, pineapple, small fruits, possibly canned cherries, peaches or berries. And what of the great staple of the Willamette Valley and all Western Oregon and Washington, the prune, a few years ago of so great promise, so highly figured, so inspiring to the hopeful, even reaching the pessimist, the banker, the speculator, the conservative, the merchant; even the idle, interest-collecting capitalist; veritably a popular wave that swept all over California, Oregon, and Washington; with what potency to the hopeful; with what high hopes; to the visionary with entrancing, irridescent, golden visions; in realization the mythical pot of gold at the end of the rainbow. Many of us have felt the spell of it. Very truly a superior dried product—the prune. Once popular, much sought and largely consumed in America, more largely consumed by all classes in Europe. A product superlatively superior in Oregon, known in market as the "Oregon prune," Italian prune. This superior product, now for ten years decreasing alike in price and consumption, in America and everywhere. Added, the exactions of the popular taste for small, neat, showy packages, clean and attractive, 30s to 40s, possibly 40s to 50s,

at slightly remunerative figures; the large proportion of this product of smaller sizes at scarcely remunerative prices and over production, the situation is serious. What are we to do about it?

Conditions seem complicated, the solution problematic. We await the genius who shall utilize the smaller sizes in merchantable form, jellies, jams, marmalades, or other condiments; wines or brandies it may be. Yet it remains that the right man in Oregon in the right place will grow prunes, 30s to 40s, carry out all the details of ripening, drying, packing; make first-class, attractive, dried product to just meet the market demands. Added, the money instinct and business ability, and that man will achieve financial success as such a man would in any other undertaking. Such men are our rich men in any, every and all lines of business. This talent is not given to all men; a gift only to the few. Possibly the day will come, has come, when only this kind of talent will succeed with our green fruits. It may be in apple growing and some other fruits. Does not the greed for money, the struggle and intense rivalry in business methods, possibility of over production, portend disaster to the mediocre; even in the production of the apple, the one fruit in which we scarcely seem to have a rival in excellence and shipping qualities—and our most remunerative product. These silver cups offered as prizes; this elegant competitive display before us; this friendly rivalry; this superior product is of fair promise and means much for the commercial success of this industry; let us hope for a long time to come.

Hail to the apple, the queen of fruits!

SOME PROBLEMS.

Mr. L. T. Reynolds, of Salem, Oregon, read the following paper, entitled, "Some Problems," at the annual meeting of the Oregon State Horticultural Society, 1906:

We know by experience that the Bartlett pear is unproductive when planted in large blocks by itself; that it is self-sterile and must be cross-fertilized by the use of pollen from some other variety of pear. Waite, in his report of his valuable experiments on the pollination of the pear flowers, gives a list of a number of varieties which are practically self-sterile, and this includes the majority of our best market pears. His experiments also show that two or more varieties blooming during the same period in one locality may differ considerably in another. Our own experience has taught us that the White Doyenne (Fall Butter) is a satisfactory pear for cross-fertilizing the Bartlett in the Willamette Valley, but there are several varieties much more valuable in the market and one of our problems to be solved is, What vari-

eties are best for pollinizing purposes to plant with the Bartlett, selecting pears valuable for shipping, such as Comice, Bose, Beurre Clairgeau, and others? This question can be determined by those having the different varieties for observation and a list of such varieties as are suitable for planting together, in an orchard, in this latitude, would be of great value to those who contemplate planting pear orchards.

A similar question may well be asked in regard to apples. What good market apple would be best to plant with the Gravenstein, and what with the Spitzenberg?

Observation of the orchards in the Willamette Valley leads to the conclusion that a wise selection of varieties would have made a vast difference in the profits of many of them, considering productiveness of the orchards only.

It is a question worthy of consideration whether the uncertainty of our Italian prune crop is not, in part at least, because of the fact that they are planted in solid blocks and given no chance for cross-pollination.

In an old orchard we have an example of the need of cross-pollination in the case of the Washington plum. In this orchard were originally, a number of rows of plum trees, the Peach plum, Yellow Egg, and the Washington being planted in alternate rows across the orchard. Some ten years or more ago these trees were all top-grafted to the French prune except one Washington plum tree, which stood near the center of the orchard and was unusually large, vigorous and productive. Since that time it has retained its unusual vigor, but stands barren and has not borne a crop of plums during the whole ten years.

That the Royal Ann cherry is far more productive when properly cross-pollenized is well known, but experience has convinced me that care should be taken in selecting the varieties to be used for such crossing. The Black Republican has, with us, very often bloomed too early to properly pollenize the Royal Ann, while the May Duke usually has its pollen ripe when the stigma of the Royal Ann is withered. The Bing, apparently, has shown no effect as a pollenizing agent, but the Deacon and Lambert appear to be very effective in cross-pollenizing the Royal Ann. Please understand that this is only given as experience in the orchard with reference to trees standing in proximity where cross-fertilization would naturally be expected, and not as a result of carefully conducted experiment. The importance of securing the best cherry for crossing with the Royal Ann is increased, if, as some experiments seem to indicate, the different crosses exert a direct influence on the size of the fruit, since the value of this fruit for canning depends largely upon its size.

A series of careful experiments upon this subject would be of great value.

A problem which will become more important as the acreage in fruit increases is that of competent help for the harvesting of our crops. In some of the districts of California this has already become a question of vital interest. Our berries, cherries and other small fruits are delicate,

perishable products which must be picked, packed and marketed in a very short time. This requires plenty of help in field and packing house and prompt service by the transportation companies if the producer is to prosper. Even with an abundance of help, there will be a large amount of fruit unprofitable for shipping purposes, which must be utilized if possible, and for this purpose the cannery and factories for the manufacture of pure fruit jams, jellies, flavors and vinegars should be secured, wherever they can be run with profit.

The problem of insect pests is one which meets us each year, and we may as well decide first as last, that we will be compelled to wage a continual warfare against the codling moth, pernicious scale and all the other insect or fungous pests of the fruit tree. It would also appear that some action should be taken to introduce into this State some of the beneficial insects, which our neighbors on the south have secured and thus make use of some of the natural enemies of the scale, the codling moth, etc., as well as to adopt the motto, "Spray without ceasing."

When once we begin to look for problems we conclude the fruit grower has no need to be idle.

WALNUTS AND FILBERTS.

(Written by Felix Gillette, Nevada City, California, for the *Oregon Agriculturist and Rural Northwest.*)

In these times of walnut booming, since such a thing, it seems, is sweeping like a tornado over the great Northwest—and a legitimate boom it is, I am glad to say—anything referring to the walnut should be acceptable to your people; so I will, in this letter, dwell not precisely on the possibilities of that part of the Pacific Coast of becoming a regular walnut-growing district, which it is doing very rapidly, but discuss the best ways for your people, in taking advantage of your natural conditions over other walnut-producing districts, like Southern California, for instance, to make walnut growing pay and pay well. It is a fact that wherever walnut trees which vegetate late have been planted in the Northwest in soil most congenial to the walnut, that is, a deep, rich or medium rich and moist soil, they have done wonderfully well, beginning to bear at eight years from the seed, and bearing beautiful nuts. I say beautiful, not in a flattering sense, but because it is so, if I have to judge by the very pretty nuts sent to me from various parts of Oregon and Washington. What I like in Oregon-grown nuts of these French, late-vegetating varieties like Mayette, Franquette, Parisienne and the like, is the fair size of the nuts—and commerce rejects extra large nuts as well as extra small ones—then the smoothness

Orchard and 27-acre Strawberry Field of A. P. Bateham, Mosier, Oregon

A Summer Lake Orchard Home, in the isolated interior of Oregon

and whiteness of the shell, a more important point than a good many of your readers may have an idea of, and as important as the shape and size of the nuts; then the meat, filling the shell well, being as nutty and sweet as are our best walnuts here; and last, the kernel being invested with a pellicle of a pale yellow color, making them perfect in every way. From the southern part of Washington very fine nuts were also sent to me, and what surprised me the most was to receive from Whitman County, in Eastern Washington, and where in winter the thermoneter sometimes goes down to 20 degrees below zero, as fine Franquette walnuts as were ever raised here in California. The young trees, it must be well understood, when planted in such cold climate, must be protected the first two or three years or till they are branched, to prevent injury from the severity of the winter.

Now, I want to make your people understand that the market for walnuts is divided into two distinct classes; one class including walnuts with their shells, and mostly sold as dessert nuts, such as the first grade of Mayette, Franquette, Parisienne; the second class including all smaller grades and shipped to market, either not shelled or shelled, is used for the manufacturing of walnut candy and walnut cake. I need not say that dessert nuts bring the best prices; so, for instance, the Mayette in its home in France, sells at wholesale from 7 to 8 cents a pound, while in inferior grades of Dordogne nuts, of all shapes and sizes, sell at 3 cents to 4 cents a pound. Enormous quantities of walnuts are imported into this country from Europe, shelled and not shelled, and I couldn't help but smile at the ignorance of some walnut growers down in the southern part of this State, who claim that since California was producing such large quantities of walnuts, the imports were getting less and less every year. Well, let us see:

In 1902 the imports of walnuts were as follows: Not shelled, 9,702,558 pounds; shelled, 2,224,879 pounds; total, 11,927,432 pounds.

In 1903—Not shelled, 8,936,438 pounds; shelled, 3,035,970 pounds; total, 11,972,408 pounds.

In 1904—Not shelled, 19,456,012 pounds; shelled, 3,579,941 pounds; total, 23,033,953 pounds.

In 1905—Not shelled, 16,312,138 pounds; shelled, 4,198,009 pounds; total, 20,490,147 pounds.

These figures having been obtained through the courtesy of Mr. O. P. Austin, chief of Bureau of Statistics, Department of Commerce and Labor, at Washington, must be regarded as correct.

Thus it is seen what enormous figures the consumption of walnuts in this country amounts to, especially when we take into consideration the large quantities of walnuts produced in this State, with the bulk of it shipped East. In two years the imports more than doubled, and I ask, With such figures staring us in the face, can there be any fears on our part for the walnut business getting to be over done as the prune business has been? But it is right here that I want to call the attention of

your people to their possibilities in supplying our confectioners with nuts, say of your smaller grades, surely quite an improvement on the imported shelled nuts, for the making of candy. Another advantage of Oregon-grown walnuts is to have the kernel invested with a light-colored pellicle, so much sought after by confectioners for the making of walnut cream candy.

Now let me tell your readers what are the requisites to constitute a variety of walnut to be the best for the making of such candy. Besides not being bleached, and bleaching is unnecessary in this case, the nuts have to be of small to medium size, rather round, thin-shelled and easy to crack, which is done by striking the nuts gently on the face with an ordinary hammer, but not on the seam or either end, so as to get the meat out entire or, at least, in halves, without bruising or breaking it; it is desirable to have nuts with meats that do not fill the shell too tightly; the kernel should be invested with a light-colored pellicle, surely not dark brown, as is often the case with walnuts grown in a warm climate or with certain varieties. It goes of itself that the nuts should be of first quality, sweet and nutty. Well, I do not know of any out of my twenty-six varieties that fill the bill so well as the little Chaberte. As I and my folks have been making nut candy for the holidays, I send you by mail with the present a little box of walnut cream candy, another of filbert candy and filbert cookies, besides two boxes of filbert nuts, just to show you what can be done in that line. A part of the walnut cream candy is made with Chaberte and the other part with Mayette and Franquette; at a glance you will perceive that the Mayette, the "queen of the market," as called in France, for it is a nut of elegant shape, thin-shelled, large and first quality, makes too big candies; and the Franquette, another fine dessert nut, worse yet, because of its too elongated shape, and so on of all large-fruited varieties. Out of the 23,033,953 pounds of walnuts imported in 1904, 17,123,083 pounds were imported from France, 14,000,000, or about, being not shelled, the largest portion of that amount beging Mayettes; no Franquettes are imported into this country, what are raised in France of that long and fine dessert nut being shipped to Russia and England. Inferior grades of walnuts from the Departments of Dordogne are mixed with the pure article of Mayette, either at Marseilles, France, or New York and Chicago, so I am told.

FACTS ABOUT FILBERTS.

Now about filberts: The commerce of that pretty little nut, as shown by the statistics of the Department of Commerce and Labor, is not precisely a small one, for they are imported by the millions of pounds, increasing in importance every year.

In 1902 filberts were imported into the United States as follows: Not shelled, 6,915,659 pounds; shelled, 656,748 pounds; total, 7,572,407 pounds.

In 1903—Not shelled, 7,441,083 pounds; shelled, 676,827 pounds; total, 8,117,910 pounds.

In 1904—Not shelled, 8,042,692 pounds; shelled, 695,315 pounds; total, 8,738,008 pounds.

In 1905—Not shelled, 6,669,857 pounds; shelled, 915,227 pounds; total, 7,585,089 pounds.

Again, are not such figures quite encouraging for the raising of filberts in this country, especially in the Northwest, that seems to be wonderfully adapted to the raising of that nut? But let me tell your readers to be slow in believing too exaggerated reports on the yield of filbert trees, as well as that of any other nut trees, which is all done for a purpose; what you want are true facts about the nut business, new to so many of your people. I have taken the pains to find out how filberts do in Oregon and Washington, since I consider these two States eminently adapted to filbert culture, and better than any other States in the Union; so I will quote from a recent letter of Mr. A. A. Quarnberg, of Vancouver, Washington, a member of the County Board of Horticulture, and whom I regard as a responsible and reliable person, and who eleven years and five years ago had planted on his place 300 filbert trees, Du Chilly Cobnut and Barcelona, the following extract:

Last winter you requested me to give you an estimate of the yield of my filbert trees, and having made careful notes of their yield the present year (1905), I now have the pleasure of giving you the following results: Well-loaded five-year-old trees yielded about five pounds each, and I think it is safe to say that for each additional year in age the increase in yield was about one pound per year, at least as old as I have the trees; my eleven-year-old Du Chilly Cobnut trees yielding eleven pounds to the tree. The yields you mentioned reported by certain nurserymen are undoubtedly much exaggerated, as my eleven-year-old trees had what I call a good crop this year. After the formation of the head I have not pruned nor thinned my filbert trees worth mentioning. I notice the same tendency by many to exaggerate the yield of walnut trees. My eleven-year-old walnut trees bought from you averaged this year about twenty-five pounds to the tree, and I call that doing well. While I know individual trees have done a great deal better, I think twenty-five pounds average is good enough for eleven-year-old trees. My eleven-year-old walnut trees are now about three feet in circumference near the surface of the ground, about two feet in circumference four feet up; they are fully twenty-five feet high and twenty feet across the crown.

I have from another source more figures to give you as to the doing of filberts and walnuts, also in the vicinity of Vancouver, where Mr. Henry J. Biddle, of Portland, planted a grove of walnuts and filberts, all furnished by me, some twelve, ten, seven and four years ago. Mr. Biddle never tried to find out what the yield of his filbert trees amounted to apiece, so he gave me only a rough estimate. I will quote from his letter:

The twelve-year-old Barcelona must have had twenty-five to thirty pounds apiece (last year somewhat less); the Du Chilly Cobnut, ten to fifteen pounds. The Avelines bore very heavily the past year, but I can not give any estimate of their weight. The bluejays got away with practically all my Avelines. The Du Chilly Cobnuts were very large

and fine this last year, the Barcelonas somewhat smaller. My ten and twelve-year-old seedling walnuts averaged thirty pounds to the tree (after drying). I find the nuts here must be artificially dried, and they lost one-third in weight in curing. They were not as large as the year before, although the Mayettes produced quite showy nuts.

I give your readers these figures on the yield of young filbert trees, as I consider them reliable, to show them what can be reasonably expected from the planting of filbert trees. I think, however, the rough estimate of Mr. Biddle to be a little too high, but I requested him to be kind enough next fall to ascertain for sure the yield in weight of his filbert nuts per tree. Right here I would like to call the attention of people desiring to plant filberts that the best and surest way of propagating the filbert is "from layer," but never from the seed, or else they will expose themselves to bitter disappointment. In all filbert districts the trees are propagated solely "from layers," never from the seed nor from suckers, which are apt to sucker themselves; so they had better keep a sharp lookout and be sure that seedlings nor suckers are not passed on them for "rooted layers," the same as in Southern California, unscrupulous fakirs are passing walnut trees simply cut back for grafted trees, as the cut-back tree looks a good deal like a budded or grafted one. With the present I send you a little box of filbert candy. In the making of that candy I used the white and purple leaved Avelines, for the pellicle of one is white, the other flesh colored, the red Aveline, pellicle being too dark, though it is also a very fine nut. The oblong filberts, like all those Avelines, crack very easily by laying them on the face on something solid and striking them with an ordinary hammer; but the round filberts have to be hit with a very small hammer on the small end, the shell bursting in two, letting the whole nut out. I crush the ruts with a roller for the making of candy, but first flatten them up with a flat iron; they may also be ground in a fine meat cutter. You will notice that the filbert candy I am sending you melts altogether in the mouth. At the same time I send you two boxes of filberts of what I consider so far my best varieties, viz., Du Chilly Cobnut, Barcelona, White Aveline, Red Aveline, Purple-leaved Aveline, and Emperor, the five former ones having been introduced by myself into this country thirty to thirty-five years ago, the latter one by the Department of Agriculture, from Belgium in 1899. I am still experimenting on ten more varieties introduced by the Department from Istria, Sicily, and Belgium.

WALNUT GROWING IN OREGON.

Mr. Thos. Prince, the leading walnut grower of Oregon, and owner of the largest bearing grove in the Northwest, read the following paper at a meeting of the Horticultural Society at Forest Grove, February 17, 1906.

On my first trip to Oregon, some nine years ago, I met an old gentleman who was a native of England, and our conversation drifted to

walnuts. He said the climate of the Willamette Valley was very similar to that of parts of England, where they raised large quantities of walnuts, and he thought this valley was an ideal country for that nut.

I learned that Felix Gillet, of Nevada City, California, was regarded an authority on nut culture, and I at once opened correspondence with him. He expressed confidence that the late-blooming French varieties of walnuts would thrive here. He said he had furnished trees to parties here, who had already obtained results, and he had no hesitancy in advising me to set out some trees of those varieties.

As I did not feel like setting out a few trees and waiting eight or ten years to demonstrate the success or failure of the experiment, I took chances on the outcome, and set a considerable number of trees, in order to secure the benefit in my life time, if the experiment should prove a success. The result is that I have about 1,500 trees, eight and nine years old, which have commenced to bear, and I feel highly gratified at the prospect.

Last season I had about two tons of nuts equal, if not superior, to any English walnuts grown anywhere. I have shipped my nuts to Portland, to various other places in the State, and also to the East, and they have given universal satisfaction. I have received a higher price than that paid for the California nut, and I know that my walnuts have retailed at a higher price, in competition with the California product.

I do not believe there will be any occasion to bleach the French walnut grown in this valley, as they are of light color and very attractive.

The trees are very hardy. I have planted about 3,500 trees, altogether, and have not lost more than a dozen. They will bear a few nuts at seven years, and increase production annually. The quality of nuts depends largely on the size of the tree.

I have a few nine-year-old trees which are one foot in diameter, and whose tops have a spread of twenty-five to thirty feet. Last season a few of the trees yielded from twenty-five to forty pounds of nuts. There is quite a lack of uniformity in the size of the trees, some of the nine-year-old trees being no larger than a five or six-year-old tree should be, and bearing a few nuts. I think the average yield of the nine-year-old trees last season was eight to ten pounds. I take no stock whatever in the extravagant claims put forth by interested parties, regarding the yield and profits of a walnut grove.

There has been considerable said of late about the advisability of grafting the French varieties onto the black walnut. I can say but little on that subject. I have seen nuts from trees produced by that union, and Mr. McDonald of the Oregon Nursery Company exhibited the same kind of nut at your meeting here two weeks ago; but such nuts do not appear to me to have the fine appearance of the nuts raised on the grafted tree or the second generation tree, and I believe it is yet an experiment. I am going to try it myself in a small way. It is claimed that such a union will produce a more vigorous and rapid-

growing tree, but I don't believe that, at nine years of age, such trees will be superior to mine.

As to varieties, I would advise planting none but the French varieties and those that bloom late enough not to be caught by the spring frosts. The Mayette, Franquette, Parisienne, Proeparturien and Chaberte are all superior varieties and adapted to our climate.

Beware of the varieties originated in Southern California, and nuts brought from that region. Many trees of the Ford and Santa Barbara varieties have been sold in our State. They are not adapted here. They put forth so early in the spring that the frost is sure to catch them. I know of several such experiences.

OVERPRODUCTION.

Considering that ten to twelve million pounds of walnuts are usually imported into the United States; that the use of nuts is constantly growing and that only a limited portion of the country is suitable for their production, I can not believe there is much danger of overproduction.

LOCATION FOR GROVE.

My idea on this point is that you should have a deep, rich soil, preferably on a slope, so as to insure good drainage.

My orchard is on what they call "first bench." We have clay subsoil, but no hardpan, and the trees grow well. They would probably do as well on bottom land, if well drained.

SUGGESTIONS FOR PLANTING.

Forty feet is near enough for the trees to be together, and I believe fifty feet would be better. My trees are thirty-six feet each way, and now at nine years of age, we find they are too near together.

I believe, if they were set in diamond form fifty feet apart, making the rows forty-three to fourty-four feet apart, it would be near enough. I would set the tree a trifle lower than it was in the nursery. If the root is ragged I would trim it.

I had some trees whose roots were frozen in transit, so that I had to cut away more than half of the tap root, still they have grown finely; and we do not hesitate to trim the tap root, if we find it broken or ragged.

SHAPING THE TOP.

We were advised by Mr. Gillet not to let the limbs start lower than six feet from the ground and we think his advice was good, although when the trees were five or six years old we feared they would not have a good shape.

The walnut requires very little pruning, and I think, after a few years, might safely be grown in sod.

On the whole I think walnut culture is all right for Oregon, the trees being hardy, requiring little attention and the crop being annual and

easy to handle. Provided you plant the right varieties there is much less uncertainty as to crop than with the prune, apple and cherry, and the longevity of the walnut tree is unknown—it certainly exceeds that of the fruits mentioned.

I believe the walnut industry will prove a large and profitable one for Oregon, but in buying trees and nuts be sure you know what you are getting and that the seller is absolutely reliable.

THE OREGON PRUNE.

By L. M. GILBERT.

The fruit, now commercially known as the "Oregon" prune, was formerly called the Italian. Mr. Seth Luelling, in 1848, planted, near Milwaukie, Oregon, the first commercial orchard of this variety. The fruit was greatly admired for its fine flavor, good shipping qualities, and as a dried product. Within a few years it had become quite generally distributed over Western Oregon, proving its adaptability to our climatic conditions.

About thirty years after the planting of Mr. Luelling's orchard, a great wave of prune-tree planting swept over the Northwest. Not only Western Oregon and Washington, but portions of the eastern parts of these States, and Idaho as well, participated in the movement. A heavy crop of Italian prunes in 1898, put the prune growers in possession of a supply for which there was no adequate demand. No advertising had been done by the producer; the quality of the fruit was not known to the trade; the name, Italian prune, suggested little to overcome the general aversion for prunes which had followed the importation of Turkish prunes a few years previous. These imported prunes were brought in hogsheads. They were small—merely skin and bone—but vigorous, if one may give credence to the statement that some of them were able to crawl about. Our prunes were shipped in bags to large Eastern dealers, who packed the fruit under their own brands, or resold in bags to the retail trade. The unattractive appearance of the fruit when offered to consumers fostered no demand. Men who were interested in the production of prunes saw before the close of this year's business that new lines must be followed if they would win. Local packing houses were established in the various orchard centers, and efforts were made to advertise "Oregon" prunes. It was a hard struggle, owing to lack of concerted action. Finally the small package—the eight and ten-pound box—faced and packed with fancy fruit, found to be popular, and has done more than all other agencies combined to bring the "Oregon" prune to market.

The largest body of prune orchards in the Northwest is found in the red hills south of Salem; about 3,000 acres have been set to trees.

These orchards were planted in lots of ten acres and sold very largely to non-residents, a few of whom came on to this great prune land of promise to work out their fortunes. They built dryers when the crops demanded, and since paying for these and other improvements, have been buying adjoining lots. Owing to the varied business opportunities to be seen throughout the country at large, non-resident owners of orchards have been able to invest, to better advantage, nearer home. These lots have changed hands at prices ranging from $100 to $200 per acre—less than one-half the value they will represent when our "Oregon" prune has been fully advertised, and the prune growers in general are exclusively associated in unions, with one central selling agency to do business. Producers of fruits are gradually becoming aware of the fact that one-half the business of the producer is to know the market and how to reach the best.

Orchardists who plow deep and early, and cultivate the soil while it is yet pliable, before dry weather sets in, get the best returns. There is no greater mistake than to delay cultivation until the ground has become dry. It is impossible to bring back the moisture required. A number of growers are sowing vetch—about one bushel per acre—among their trees. The best time to seed to vetch is immediately following the close of the season's cultivation in August. The crop grows all winter, storing up plant food to be made available to the trees the following season, when it is plowed under as a soiling crop. The necessity of supplying some means of fertilization to orchard soil must have early recognition if our valley trees are to continue to thrive as in the past.

There has been quite a revival of prune-tree planting in this district in the past four years. Owners frequently yield to the temptation to plant too many trees to the acre. It seems, at the time, a waste of land to set the nursery stock with spaces of twenty-five or thirty feet. The planter of trees should look ahead a few years and see his bearing tree, and give it room according to its strength.

Young trees, as well as bearing orchards, should have vigorous cultivation. Five dollars per acre will give an orchard fine culture; $1.25 is the customary price per acre for plowing, and 25 to 35 cents for harrowing or floating. To plow in April, harrow twice before the first of June, harrow and follow with float during June, and repeat the treatment twice each of the two succeeding months, will give a fruit crop all the cultivation and moisture required to produce the best. Care must be taken that no part of the early season's work is done when the ground is wet; and also to have the float follow the harrow during the dry season, before the process of evaporation has robbed the trees of their supply of moisture.

The prune harvest begins from the 10th to 20th of September. Every dryer has a supply of fruit boxes, which are scattered through the orchard at picking time. About 5 cents per bushel is paid for picking. The fruit is ordinarily allowed time to ripen and drop from the trees;

but some prefer to hire a good hand to shake their trees slightly, keeping ahead of the pickers each time over the orchard and cleaning the trees the final picking.

Before being spread on the trays, the fruit is dipped in boiling water, to which a little lye has been added, just enough lye to check the skin of the prune. It is then rinced in clean water to remove the lye. From thirty to forty-five hours are required to cure the fruit, depending somewhat upon the kind of dryer and also upon the amount of lye used in dipping the green fruit. A few growers have discarded the use of lye altogether, believing the extra expense in drying will be made good in added weight of the cured product, and that in time prunes not dipped in lye will fetch a premium.

Many operators of dryers haul the cured fruit away to the packing house immediately after taking it from the trays. This is a great mistake. The fruit should first be thrown into bins and allowed to pass through the sweat before being weighed or graded. Why give away all the profits to the packers? They have the processing and fixed price per pound for packing. However, when we consider—and stop to appreciate—the benefits that have accrued to the business since the building of local packing houses, we will not be hasty in beginning to "knock" the packers. They have very largely remedied the deplorable conditions that prevailed in 1898, when the fruit was shipped in bags. They have done practically all that has been done to advertise the "Oregon" prune, and gain for it a place distinctively its own in the markets of both our own country and Europe.

Many growers of prunes are beginning to see that it may be necessary for growers themselves to become packers of their own product, and in other ways associate themselves for the promotion of the general interests of their line of business. And to this end, prune growers' unions are being agitated in some localities. There is every reason to believe that unions of prune growers will result in as much benefit to the producers of cured prunes as have such organizations to mohair growers and apple men.

THE EUROPEAN GRAPE IN OREGON.

By E. A. REUTER, Forest Grove, Oregon.

Contrary to general expectation, Oregon, the land of rain, is capable of producing some of the choicest vines.

The vine or European grapes are successfully grown in the Rogue Valley and on the hills surrounding Forest Grove. At the former place Muscat and Tokay thrive well, while at the latter they can not be depended upon. The varieties best adapted to this section are Sweetwater and Black Hamburg—both are suitable for table or wine. Per-

haps the most prolific vine grape is the Zinfandel, which, where the year is favorable, contains also the higher per cent of sugar. Varieties like the Risling and Burgundy are too unproductive to be profitable, although they produce the finest wine. That there are, or will be found, more suitable red varieties is merely a question of time.

The best location for a vineyard is on a southern slope at an elevation of about 500 feet. It should be situated so as to insure good air drainage, for most grapes are subject to mildew. The soil best adapted to their growing is the ordinary shot land, with a red or soapstone subsoil—it is warm and porous and grapes thrive well upon it for about ten years, after that it requires a generous layer of compost.

They should be planted in rows at least eight feet each way; however, nine is preferable. Planted thus, they yield with a minimum amount of care a larger crop per acre than those less distant.

Some growers in this locality have their vines six feet apart, but after the fifth harvest they have produced much less per acre than those eight or nine feet apart. The crown system of two feet or more observed in their training is preferable to the trellis, affording greater facility in cultivating and harvesting them.

For vine growing, the shoots should be allowed to grow their full length—even if they are more apt to break—the grapes become sweeter and ripen earlier. Opinions differ, but experience has shown the writer that the less foliage there is the fewer grapes there will be. Although in Oregon there is a superabundance of foliage, it is essential to a crop of fine quality. It is the leaf which converts the carbonic acid into grape sugar.

The grape, like other cultivated fruits, has its enemies, the most common of which is mildew. It usually makes its first appearance in spring during the formation of the berry; the vines should then be sprayed, or have a liberal application of sulphur, which may be dusted over the vine through a piece of burlap. This should be repeated three or four times.

The harvest is usually deferred so long as the weather permits—the quality of the vine depending upon the maturity of the fruit. The average yield is fifteen pounds per vine, or about 800 gallons per acre.

The process of wine making is very simple. The grapes are crushed and stemmed, then put into a vat, in which they remain until fermentation has ceased, which lasts from seven to twelve days. The liquid is then drawn off into barrels. The wine should be racked off twice before spring; and if it is to be bottled, it should be racked off until the sediment has entirely disappeared. The barrel should be kept full. In wine making it is imperative that the strictest cleanliness be maintained, and no less important a feature is doing everything at the requisite time.

The Oregon wine is like the European in quality and bouquet, and aging each year improves its quality. The writer had muscat in which the bouquet did not develop until the third year. So far little of the

wines have been bottled, having, according to one writer, "been put into kegs and trundled off to market—and this for a price ranging from 50 to 75 cents per gallon." The one drawback has been the difference in vintage, and the consequent lack of a uniform grade; but this can be partly overcome by blending the various years.

The subject of marketing is perhaps one of the most serious problems confronting Oregon vintners. Although there is always a demand for good vintage, the limited scale on which the industry is carried on does not warrant shipment to other sections of the country. The transportation rates are so exorbitant that shipment in small quantities is out of the question. Then, too, the adulteration of the wine at the railway station is a source of great dissatisfaction to the grower.

That the Oregon products rank high in competition with other wines has been shown by the medals awarded it at the Omaha, Pan-American, and Charleston Exposition.

WALNUT CULTURE.

By HENRY E. DOSCH, Hillsdale, Oregon.

"Our doubts are traitors,
And make us lose the good we oft might win
By fearing to attempt." —SHAKESPEARE.

Walnut culture in Oregon has attained the dignity of a horticultural pursuit, and we have successfully passed the experimental state.

It is most gratifying, to me, to know that at last English or, more correctly speaking, French, walnut culture is receiving the attention it deserves, though it is nearly twenty years since I first experimented with walnut culture, and introduced into Oregon and the Pacific Northwest the French varieties best adapted to our climatic and soil conditions. All the walnut trees planted since in Oregon, Washington, and British Columbia, many of which are now in full bearing, were planted at my earnest solicitation, including the now famous walnut grove of Mr. Prince, near Dundee; the nucleus of which was planted by Mr. Zach Davis, for which purpose I visited at his home, and selected the first one hundred trees for him, all grafted trees, which came from Mr. Felix Gilet, Nevada City, California. This grove has now grown to one hundred acres—hence I am doubly gratified to know that my advice has proven so satisfactory to the planter.

PLANTING TREES VERSUS NUTS.

There has been considerable controversy about the trees grown from seed of first generation bearing smaller nuts than grafted trees. I have not found it so; for I have just as large and fine nuts on my trees

grown from first generation nuts as those from grafted trees, but also found that both kinds have some small nuts as well as extra large nuts, which led me again to study that point, and have reached the conclusion that the difference in size is due to pollination and starvation.

When in the spring the pistillate blossoms appear, they usually come in pairs, and generally are of equal size until they reach the size of peas, when quite frequently one of them forges ahead in growth and vigor by being better pollinated; being stronger uses more nourishment, or, in other words, the smaller one is starved, makes little growth and in consequence produces a smaller nut. If both are equally well pollinated the nuts will be of the same size; hence we find three sizes on each tree. It seems to be the law of nature—"The survival of the fittest."

In most instances trees were planted instead of nuts, the reason for which is, that nuts of proper variety and generation could not be obtained, as is possible now. Even the nuts I imported from France proved very unsatisfactory as to size and quality. However, in the absence of the right variety and generation of nuts, I see no good reason why one should not plant trees. Better plant trees known to be of the desired generation and variety, than not plant at all.

HOW TO SPROUT NUTS.

There are no doubt many planters who prefer to plant the nut where the tree is to grow, and for their especial benefit I repeat the *modus operandi*. The nuts for this purpose must be secured in the fall before they are dried, and be of first generation; either from original trees or grafted trees, known to be true as to that point, else you will be disappointed when the trees come into bearing. Fill some boxes six inches with light soil and sand mixed, then put in the nuts, pointed end up, about one inch apart; cover three or four inches deep, and place the boxes out of reach of rats, squirrels, and gophers, keeping the soil moist. On examination in the early part of April you will find all sound nuts have sprouted, that is, the nuts throw up two sprouts from the pointed end; one of these sprouts turns down over the nut and forms the taproot; the other sprout continues upward and forms the tree. Now remove them very carefully, as these sprouts are brittle and easily broken, which would make the plant worthless. Plant them either where you wish the tree to grow (by far the best way) or in nursery rows, about five inches deep. The young tree should be allowed to grow straight up, cutting away all side branches until the tree has reached a height of six feet, when it should be allowed to branch out, but under no consideration should the main stem be cut off.

GENERATIONS.

The reason I emphasize the fact of securing only nuts of first generation is obvious, but as "generations" is not clearly understood I will explain, so that no possible mistake can be made: First generation nuts are produced on the original trees, or on trees grafted from the original

tree; these nuts when planted produce "second generation" trees, and the nuts from these second generation trees are a little larger than the original or first generation, which is due to our peculiar soil and climatic condition, so well adapted to walnut culture. Trees grown from second generation nuts retrograde very rapidly, producing nuts not half so large as even the first generation, and finally run out altogether. Hence we must plant nuts from the original or grafted trees, if we desire the best results, and nothing but the best should or can be satisfactory.

ESSENTIALS.

In walnut culture three things are absolutely essential, and it is difficult to say which is most important. They are soil, variety, and generation. While walnut trees do well on most soils, even rocky ground, they are grateful to kind treatment by planting in fairly rich soils, but there must be *no hardpan*. The subsoil must be loose and open so the taproot can grow down as far as it desires, for so soon as it strikes hardpan the tree stops growing and, of course, lessens the nut crop, as nut trees make very few lateral roots. In fact, it is suicidal to plant nut trees on soil underlaid with hardpan.

The trees should be "second generation," as above explained, either grafted or from first generation nuts.

Varieties, which I have found best adapted for the Pacific Northwest by extensive experiments with Serotinas, Proeparturiens, Franquette, Mayette, Parissienne, Cluster, Vourey, and Chaberte, are Franquette and Mayette as best adapted to our soils, climate, and market, with a few Chaberte for confectionery use, giving preference in the order named, as I consider the Franquette somewhat hardier, a more regular bloomer, and a little more prolific.

DESCRIPTION.

Franquette Walnut.—Originated about the same time as the Mayette, in the southeast of France, by a man named Franquet. It is quite large, of an elongated oval and very attractive. Kernel full fleshed and sweet. It buds out late in spring, and has never been injured by frost on our place, though quite high in the mountains.

Mayette Walnut.—This is one of the finest dessert nuts grown. It is quite large, and uniformly so; well shaped, with a light-colored shell; the kernel is full fleshed, sweet, and nutty; but what renders this remarkable kind so much more valuable is the very late budding out, which enables it to escape the disastrous effect of late frosts in the spring; it is an abundant bearer. This is the nut imported into the United States under the name of "Grenoble." The Mayette was originated by a man by the name of Mayet, about one hundred and forty years ago; the nut having ever since been a great favorite.

Chaberte Walnut.—An old and most valuable variety; late in budding out. The nut is well shaped, roundish oval, and fair size, though it is not what is called a large nut. The kernel is extra fine quality;

good bearer. The Chaberte was originated over a century ago by a man named Chabert, hence its name.

(The foregoing descriptions are taken from the catalogue of Felix Gillet, the veteran walnut grower of Nevada City, California.)

TAPROOT OR NO TAPROOT.

I have experimented considerably with various fruit trees on the "Stringfellow method" of root pruning when setting out young trees, that is, cutting away all the roots except a few stumps about three inches long, and obtained marvelous results; the grand root system these trees developed led me to try it on walnut trees, especially as there is a great controversy whether the taproot must be left on, or if the tree is injured by cutting it off when planting. For this purpose I used some seedling trees of my own growing, and seedling and grafted trees of various varieties from Mr. Felix Gillet, and cut away every particle of the roots except the stumps, scarcely three inches long each, and planted them as you would a stick; simply stuck them into the ground the proper depth. I had great faith in the Stringfellow method, but hardly enough to hope for good results on walnut trees, especially on my poor, heavy, clay soil. For the past six years these trees managed to maintain themselves, and even made some growth, about three to six inches each year, but this year these trees grew from four to five feet, and a number of them produced some beautiful nuts. These trees not only grew new taproots but developed a marvelous lateral root system, to which latter fact I attribute the growth, as ordinarily walnut trees have very few lateral roots.

However, I am not yet ready to advocate the Stringfellow method of root pruning on nut trees until further investigation, though perfectly satisfied in my own mind that in planting trees generally, especially on clay soils, it is the only proper method to follow. For the purpose of further experiment the Oregon Nursery Company kindly sent to me a dozen of yearling Franquette walnut trees, and hope to be able to give good and satisfactory results next year.

BUSINESS PROPOSITION.

As stated in the beginning, there are now many small walnut groves in full bearing, which are as profitable to the acre and soon will be more so than any other horticultural pursuit, even the famous apple. The trees are generally healthy, have few enemies, either insects or fungus, and require but ordinary good care. The nuts fall to the ground as soon as the hull bursts, which it does when the nuts are ripe, and can be picked up easily, and must be promptly, as squirrels are very fond of them. The nuts should then be cured, either in the sun or subjected to a gentle heat in an evaporator to prevent mildew or becoming rancid. In California the nuts are bleached in addition, to give the shell a light color, for which purpose sulphur is used, same as bleaching dried apples.

As a business proposition I know of no better in agricultural or hor-

ticultural pursuits, and once established, a well cared for grove is the best heritage a parent can leave to his family, as they become more valuable and more productive with age. I have in mind now two English walnut trees on a gravelly hill east of Portland, which are over forty years old and bear an average of five to six bushels of nuts each per year, which so far had a ready market of 12 to 15 cents per pound. Unfortunately these trees are of the old English variety, the nuts rather hard shell and not uniform in size; they were grown from seed sent from England, but are a very good example to show what the walnut will do on good, loose soil.

The United States imported last year over twenty million pounds of walnuts, and the importations into Oregon amounted to over four hundred thousand dollars. Instead of importers, we should be exporters. We have the soil and the climate, hence my earnest advice: plant a few walnut trees, if you do not wish to plant a grove, and your children and children's children will bless you and thank you for your forethought.

CAUTION.

In conclusion, allow me again to warn and caution you in your selection of either trees or nuts. Don't take any seller's representation for granted; be sure you are right in your selection, and then go ahead, and if you have secured the correct variety and generation you will never regret it.

As I continue to receive many letters asking me to quote prices for nuts and nut trees, I beg to state again, that I have neither trees nor nuts for sale; my experiments in walnut culture are partly for my own pleasure and partly for the benefit of those who desire to own a good walnut grove.

TO GROW STRAWBERRIES SUCCESSFULLY AND FOR PROFIT.

By J. W. GRASLE, Milwaukie, Oregon.

There are several important matters to be considered. First, soil; second, location; third, kind of plants—varieties; fourth, care and cultivation.

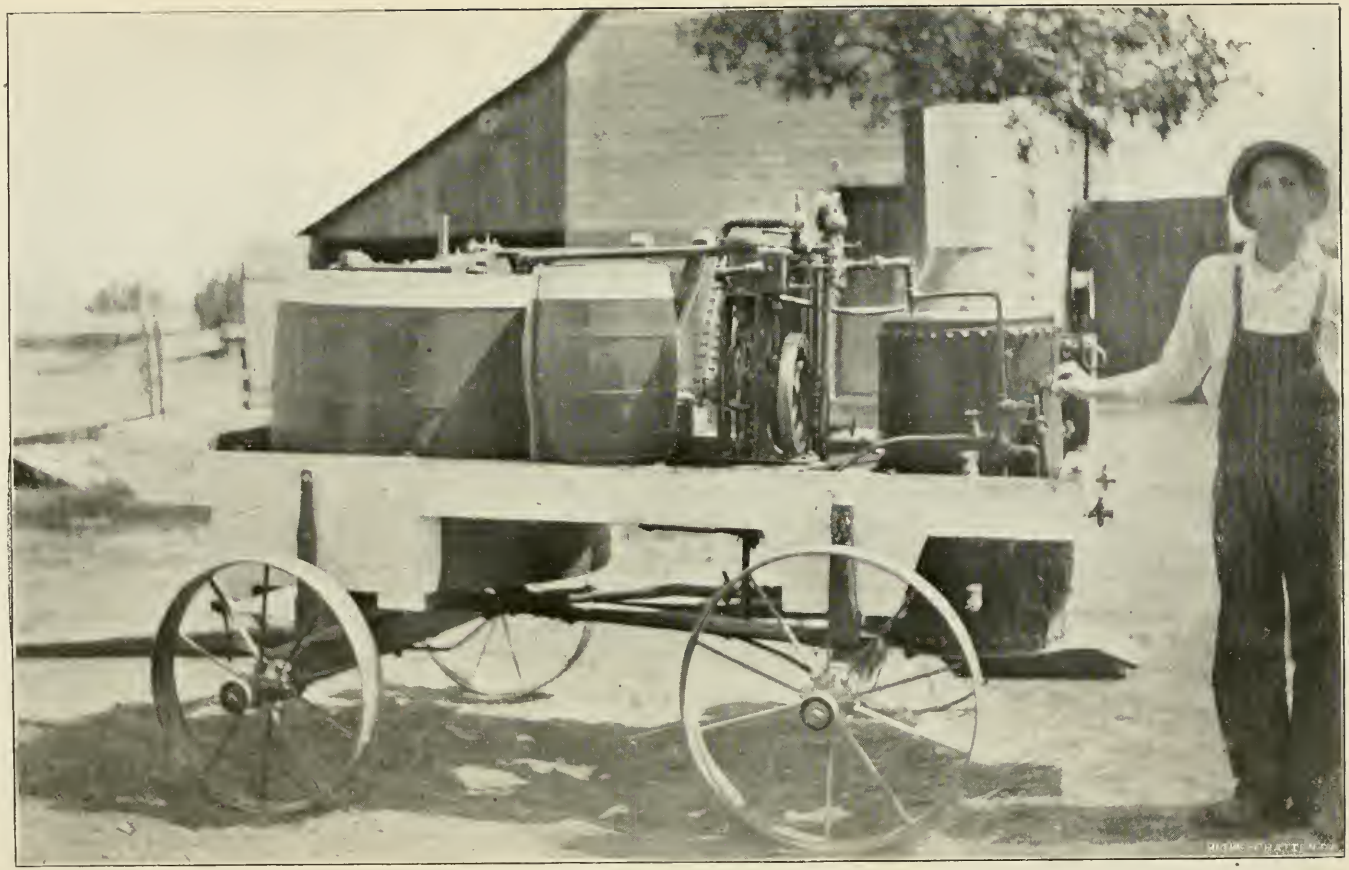
Any good garden soil is adapted for the growing of strawberries. I do not like the extremes of light sand and heavy clay, but either clay or a sandy loam will do, the latter preferred. The question, do corn, potatoes and garden truck do well; if so then strawberries will flourish. If the land lacks fertility, then put on a good coating of well rotted manure. Tillage is manure; that is, it makes all the food in the soil available and so if the land is not rich, give extra tillage. Low land, that is, lower than the surrounding fields, is not desirable, as it is liable

to injury by spring frosts, while higher land will not be affected. A sandy loam, or even a gravelly loam, on a south slope is the proper place for early varieties, as these conditions insure a warm soil and will mature and ripen berries far in advance of any other conditions. It is a mistake to plant strawberries on too new a soil, and it should be cropped for at least two years, in order that the soil may become more compact and the vegetable matter may become well mixed with the soil before the plants can appropriate its elements, and plants will do much better in the dry season. All strawberry land should drain well. Prepare your soil well, and at such a time when it will pulverize and not get lumpy. Harrow repeatedly, smoothen with roller or leveler, and then allow to settle for a week or ten days. You are then ready to plant, which should be done in the spring of the year as soon as all danger of frost is over. I have found planting in hills the most satisfactory, as one is better able to keep them free from weeds. Plant three feet or three feet six inches apart, and fifteen to twenty inches in the row, all depending on the variety, as some kinds spread out and need much more room than others, especially the Magoon. We select our plants from yearling; plants that have matured strong runners since the month of August prior to the time of planting; select from a strong well-developed mother plant and you can expect a good result. Keep your new plants well cultivated and free from blossoms and runners, as the growing of runners will have a tendency to weaken the plants the first season. There are various methods of planting. Some use what is called a planting trowel, and others a dibble. I prefer a spade, with which two persons can plant three to five thousand plants per day. It is very essential that the plant be set rather deep, being careful not to cover the crown, as the settling of a newly planted field has a tendency to expose some of the roots and cause them to dry out. Go through the rows with a harrow-tooth cultivator immediately after planting is finished, which has a tendency to encourage capillary attraction. As already stated, keep the runners cut, and the following season you will have a promising patch of strawberries. Pick carefully, pack honest, and in clean packages, and the demand will be greater than your supply.

HOOD RIVER METHODS FOR BETTER PRICES.

Address delivered at meeting of Rogue River Fruit Growers, September, 1906, by E. H. Shepard, Manager of Hood River Apple Growers' Union.

To grow fancy fruit is one part of the orchard industry; to sell it, another. The first, to a certain extent, is a science more or less definite, but selling depends upon many varying conditions. In fact, selling is a game, and to play the game and win is not easy; and still more difficult



Steam Spraying Outfit of Frank Dethman, Hood River, Oregon

is the task of telling how it is done. However, there are certain principles that are generally applicable to all cases, and of these it is my purpose to speak. In addition, I am expected to acquaint you with the methods that Hood River has pursued which have been instrumental in securing for Hood River apples the highest prices ever paid. To show you what we have accomplished, it is but necessary for me to mention the following facts: In 1902 Hood River growers as individuals sold Spitzenbergs for 85 cents per box; in 1903 the Hood River Apple Growers' Union sold at $2; in 1904 at $2.10; in 1905 at $2.60; and already the crop for 1906 has been disposed of, and it is rumored that the price is around $3 per box. I regret that I can neither affirm nor deny the figure, for the reason that by mutual agreement between the buyer and the Hood River Apple Growers' Union the price for the present is confidential; yet, I am permitted to say that the price is higher than last year.

To be successful in marketing any commodity, it is necessary to produce an article of quality. Mr. A. I. Mason, who has just preceded me (and, by the way, I desire to say that no one in Hood River has a more beautiful orchard than his, and no one produces a finer crop of Spitzenbergs and Newtowns, in either size or quality), has just told you in a very thorough and able manner how to select your soil, your tree, how to grow your apple, and in fact, has acquainted you with every feature of the business from the selection of the soil up to placing the apple on the packing table. The second feature of the apple business is packing properly. The third is to gain a reputation, and the fourth, to create a demand. The reputation assists in creating a demand, and the demand insures better prices. In Hood River we have adopted the system of having the association pack all the apples of its members. The union employs expert packers to do this work, and no grower is permitted to pack his own apples. By this method we are enabled to put up a pack that is absolutely *uniform*, and we are also able to *guarantee* that pack. The grower sorts his apples to the best of his judgment and ability. It is the duty of the inspector over each crew of packers to see that no apple not up to the standard is packed in the box.

We believe that if a man has one hundred boxes of good apples and throws away ten boxes and only puts up ninety boxes of fancy fruit, that he will realize more money for the ninety boxes than he would have realized for the one hundred without any culling. Whether we are right or not in this assumption is of course a matter of opinion; yet I think the prices we are getting are sufficient proof to drive conviction into the mind of any doubting orchardist. We aim to make the package fancy in every respect. Each apple is wrapped with a printed wrapper, the box lined with white paper, and blue layer paper is placed between each layer, and on the top and bottom. The box is labeled with not only an attractive, but a beautiful label, being a perfect reproduction in color and size of the wonderful Hood River apple.

Southern Oregon is doing splendid work along these lines, and first-class work and magnificent labels are doing for Southern Oregon the same good work that they are doing for Hood River. Mr. J. W. Perkins adds attractiveness to his package by placing over the top layer a beautiful mat which contains his monogram in gilt. I also understand Mr. C. Hunt Lewis, of Medford, uses the same idea. Such originality and high-class packing is not only to be admired and appreciated, but is to be commended, for the reason that it is one of the features that create better prices. As a result of the good quality of the Comice pear and the attractiveness of the package, Southern Oregon realized the highest prices for these pears that have ever been paid. I cite these instances for the reason that right here in your own home you have illustrations of what high-class work is doing.

One of the fundamental principles of rapid success is specialism, and it is an old law of political economy that not only the individual but the locality and the community should devote its time to a specialty if it expects to achieve the greatest success either in the financial world of wealth, or the more laudable and crowning glory of fame and honor.

I believe in specialism. Hood River believes in specialism to such an extent that we produce only two varieties of apples in quantity, the Spitzenberg and Newtown, and only one variety of strawberries, the Clark's Seedling.

When a district has ascertained the kind of fruit and the variety of fruit that it can grow to the greatest degree of perfection, I believe that the greatest degree of success will result from concentrating all efforts on that variety, producing it in quantity, creating for it a reputation which will make the demand and the demand will make the price. In proof of this line of argument I will mention a few localities that are known throughout the land: Rocky Ford is famous for its canteloupes; Southern California for her oranges and olives; Fresno for its grapes and melons; Southern Oregon for its Newtowns, Spitzenbergs and pears; Yakima for its Newtowns and Spitzenbergs, pears and peaches; Wenatchee for Winesaps and big red apples, as well as other fancy varieties; Colorado for Jonathans and other fruits; Southern Idaho for its Rome Beauties, Jonathans, and pears; and Hood River for its Newtowns, Spitzenbergs, and Clark's Seedling strawberries. The success and prosperity of the individuals living in these localities engaged in specialties as compared with individuals living in localities where the orchard business is more or less general is certainly conclusive evidence. It is a great deal easier to create a demand for a commodity that is absolutely high class in every particular than to create a demand for a number of articles or fruits that are ordinary in every particular. In addition to this, the marketing of a single variety is far simpler than the marketing of a great many varieties. By having a quantity of any one variety a district is able to operate in carloads, and under the present system of refrigeration can lay its carloads down in almost any city in the Union in perfect condition. By having straight carloads of

a single variety, every city in the world is open to Western fruit. Hood River has shipped straight cars to Mexico, Alaska, the Sandwich Islands, Vladivostock, England, and numerous States throughout America. Without quantity we would be compelled to market locally. To market locally means that we are compelled to put our product in the nearest market regardless of the condition of that market, and if the same is glutted, we are forced to accept the price, however low it may be; and as many of you know, the price often comes back in red ink. On the other hand, if you have the quantity, you are in a position to place your fruit according to market conditions, and can avoid glutted markets, selecting only those that are in good condition, where there is a good demand, and a good price obtainable.

I look forward to the time when every fruit district will have facilities for taking care of ordinary fruit at home, and will send abroad only their absolutely fancy fruit. By facilities in this case, I mean the cannery, the evaporator, the fruit juice factory, the cider factory, and the vinegar factory. As an illustration of the value of such institutions I will state to you that the cannery of the Puyallup Association absorbed in one week $7,935.29 of raspberries which were not in condition to be shipped abroad, and consequently would have been an entire loss to the growers.

The points I wish to bring out are that each district should select the fruit and the variety it can grow to perfection, then grow it in quantity and do it so well and hammer at it so hard that they will create a reputation such as we have gained. When your reputation is made, the demand created, the price is sure to follow. Again, to refer to the practical side of the question, that is, the putting up of the fancy package, I want to call your attention to the care that we take in handling the apple, and, in fact, I might say the same care is necessary in handling any variety of fruit. We handle our apples as we would eggs; not because they will break, but because the bruised apple is as valueless as a broken egg. In packing we do not follow the time-honored custom of stovepiping, but the golden rule. We pack in the box just such fruit as we would be satisfied to buy if we were the purchasers and paid the price.

We put up an honest pack, a fancy pack, and the bottom layer is just as good as the middle ones, and the middle ones just as good as the top. Each specimen of fruit is perfection. As evidence of the quality of our pack I would say that the firm purchasing our apples this year bought them f. o. b. Hood River without inspection. No higher honors could be given us.

Among other details where great care should be taken, I would call your attention to the following: The proper kind of packing tables should be provided to absolutely prevent the possibility of bruising. Clean boxes are undoubtedly one of the greatest essentials in securing a good price. Apples certainly should be wiped, for the reason that the more attractive the fruit when presented to the buyer for inspection the

better price he will pay. Spring wagons should always be used in hauling, as a dead axle causes more or less bruising. It is our intention not to pack any apple that shows a bruise. Wagon covers should always be used in hauling the fruit to and from the depot, otherwise the boxes will become soiled and the fruit more or less dirty and dusty inside.

I have spoken to you about producing in quantity; about growing fancy fruit and putting up a fancy package; about creating a reputation and a demand; in fact, in a general way I have told you briefly about many of the details that have been conducive in securing for Hood River prices that are the wonder of the world. All these things any locality suitable to fruit growing can do. But there is one feature I have not yet spoken of, and perhaps it is the most important of all—that is our union. The success of the Hood River Apple Growers' Union speaks for itself without any comment. But you who are not familiar with the union's methods do not realize its value nor its benefits. The union enables you to combine the smaller quantities of individual growers and make up straight carloads. The union can put in a system of packing and inspection that secures a uniform pack and a fancy grade. The union can do business on a wholesale basis while, on the other hand, a grower can do only a small retail business, or ship his fruit on consignment. The Hood River Union raised the price on Spitzenbergs from 85 cents per box to the magnificent figure secured this year; and last, but not least, the Hood River Union last year saved its members $7,500 on boxes, paper and spray material.

Buyers prefer to deal through unions, and are willing to pay better prices, for the reason that they are sure of a uniform pack, and feel that they are doing business with a business concern that will "make good." The same feeling they do not generally entertain toward the individual fruit grower, with whom they are seldom more than slightly acquainted. And still perhaps more important than all this in connection with the union is the fact that the union always does business on straight business principles. The advantages of a union in marketing fruit over an individual are many. Let each individual present ask himself if he is, or could be, posted daily on every market in the United States. Let him ask himself if he has time to look up the rating of every fruit buying concern that he might deal with. The grower's time is completely taken up in his orchard work, which leaves him little time to keep posted on the markets, or become acquainted with fruit dealers. If he decides to market his fruit through a commission house, he does not have time to look up other firms, and is not in a position to make a comparison, consequently, marketing of fruit by the grower is to a great extent a matter of chance. I realize more fully than perhaps any individual present the importance of these last few remarks, for the reason that I have been manager of the Hood River Fruit Growers' Union and the Hood River Apple Growers' Union for three consecutive years, devoting practically all of my time to the marketing. I alone could not acquire what is absolutely necessary in the way of informa-

tion in regard to conducting the business successfully and securing better prices without the assistance of two able men. In fact, the correspondence of our union requires a stenographer who practically devotes the entire day to correspondence, which goes to every principal city in the Union, and the principal apple buyers in England. In addition to this, I have associated with me a man who inspects all the fruit after it comes from the field inspectors and before it is loaded into the car, a general assistant in the work.

Now, what I wish to impress upon your minds is this: If it takes three of us all our time to do this work as well as we do it, and I do not wish to say it can not be done better, then how can any one of you, an orchardist who is busy all day long with the care, culture, and the harvesting of your crop, singlehanded find time after your work to do what it takes three of us all day long every day in the year to do? To become acquainted with the markets, keep in daily touch to know the best fruit firms in all the principal cities, is not an easy task, nor can it be accomplished in a short space of time. After three years of arduous labor I can only finally say that we are at last in touch with the principal buyers in all the principal cities in the United States and abroad, and that to-day we are receiving daily quotations and market prices from every one of these cities.

The manager's duties are many. He must understand how to put up the fruit in fancy package for distant shipment; he must be firm in his inspection, stiff in his rejections, and treat all growers, whether they be friends or not, with equal fairness. Each member of your union must have a square deal, and there must be no preferences. In addition to this he must be posted on the demand and prices of every market. He must know where to place each variety you grow to get the best price. He must be posted on the financial condition and the method of doing business of every firm where he places your union output.

Finally, I say to you, grow what your soil and climate will produce the best, learn how to put it up in the fanciest package possible, and put up only fancy fruit. Organize a union to handle it for you, and select for a manager one in whom you have confidence, a man who is recognized as having ability. Then you will be successful; for in union there is strength. In Hood River our motto is: "United we stand, divided we fall."

PICKING, PACKING AND MARKETING THE APPLE.

By LOWELL B. JUDSON.

TIME OF PICKING.

The time of picking red apples is commonly gauged by their color, and that of yellow apples by the color of the seeds. The latter is the only reliable test of ripeness, for an apple picked just as the seeds have

turned a light brown, and before they become dark around the edges, will be found to have not only full flavor, but the best keeping quality. But red apples are often left for some time after the seeds indicate maturity to allow them to put on more color, which they do rapidly under the influence of the bright days and frosty nights of autumn; and indeed this is the only way of obtaining color on fruit in the shady portions of the tree. Growers should bear in mind, however, that to defer picking after the seeds indicate ripeness, invites watercore and shortens the life of the fruit in storage, often to a serious extent with the mid-winter varieties. Much of the complaint recently lodged against the Jonathan because of rotting at the core is doubtless attributable to late picking. Unless this trouble is corrected the sale of this valuable variety is sure to be hurt. The purchaser is completely deceived by the perfect appearance of the fruit, not a sign of decay being visible until it is cut open, when the flesh for some distance about the core is discovered to be brown, radiating in narrow rays toward the skin, which, however, it seldom reaches. It is worse than a worm hole, for that can be cut out. A box containing even a few of this sort of apples makes the consumer distrustful of the variety, while half or more sickens even the most enthusiastic friend of "Brother Jonathan."

DEVICES FOR PICKING.

Ladders.—It costs money to step on a ladder, as the orchard owner soon finds, and all that can reasonably be done by pruning to start the head of the tree low and keep it low, is a paying investment. It should be possible for several years to gather a large percentage of the crop from the ground, or with a very low ladder. Nevertheless you can scarcely make a dwarf tree by any amount of pruning, and in every apple orchard ladders of some kind soon become a necessity. Climbing about among the branches of a tree is always to be deprecated. Mr. E. H. Shepard, of Hood River, tells me that he once counted forty-three fruit spurs on the ground under one tree in which pickers had been climbing. Of all the numerous styles of ladders, some form of stepladder is best adapted to the orchard, whether the welfare of the tree is considered, or the comfort of the picker. Any ladder which must be set against the tree is a constant menace to it.

Receptacles.—In the matter of picking receptacles the greatest diversity prevails. Buckets, baskets and bags have each their devotees, and one man tells me he provides his pickers with coal scuttles. The latter, however, suggest pouring a little too strongly, and such rough treatment is not to be thought of, any more than with eggs. Buckets are more commonly used than baskets, largely perhaps because they are easier to obtain, but both are awkward to handle compared with bags. A lining of burlap greatly improves them, though it should not cause any relaxation of care in placing the fruit in them. Bags are open to the objection that the fruit in them is easily bruised if the bag brushes against a limb or ladder. In many styles of bags it is unhandy to re-

move the fruit without pouring, and to overcome this difficulty the bottomless bag has been devised, which allows the fruit to roll from the bottom when the chain is released. Such treatment might do with oranges, but with apples—never. The average picker could never withstand the temptation to stand up and let them shoot into the box the moment the foreman's back was turned. The best picking bag that has come to my notice—and I consider it superior to all baskets or buckets—is the apron bag shown in Figure 4. It is cheap, being easily made of a heavy grain sack; hangs in the most convenient position for filling, leaving both hands free; is so shallow that the first apples can be conveniently laid in it without dropping, and yet holds all the wearer can readily carry; and finally, can not be emptied by pouring unless the picker stands on his head. Give him the suggestion, as a hypnotist would do, that he is not handling apples, but eggs, and this bag will help him live up to the suggestion. Mr. Fremont Wood, of Boise, has used it in his orchard with complete satisfaction, and has not observed any bruising of fruit from the rubbing of the bags against limbs or ladders.

For hauling to the packing house the fruit is usually emptied into apple boxes, and the ease of handling these can be greatly increased by having a slot for the hand cut in each end. Any box factory will slot them for a trifling sum. The slots also serve to mark off these boxes sharply from the rest, and prevent fruit being packed in them, more or less soiled as they are; some growers have boxes especially made for this purpose, one-third larger than the common size and of heavier material with ends higher than the sides, stacking without danger of bruising the fruit. These boxes should be hauled to the packing house on a spring wagon; or, if the distance from the orchard to the packing house is not great, a stoneboat is admirably suited to the purpose.

BOXES.

The best available material for boxes is spruce, being whiter and neater in appearance than fir, and so soft that it does not easily split when nailed. Fir ends split easily, and at times cause considerable annoyance and loss by breaking apart while the fruit is being handled. Some dealers assert that fir will not split if it is made up while green, but those who have tried it find that it splits badly in seasoning. Single boards for tops and bottoms are somewhat neater than two, but are harder to obtain. Proper thickness of box material is as follows: Ends, three-quarters of an inch; sides, three-eights; and top and bottom, one-quarter. Thinner ends are apt to split; thinner sides to bulge, resulting in bruising in transportation; and thicker tops not to bulge enough, hence crushing the fruit when sprung into place.

Uniformity in the size of apple boxes is unfortunately lacking, though two sizes, known as the "standard" and "special," have found general acceptance in the Pacific Northwest. The inside dimensions of the "standard" in inches are 10½x11½x18, and this is used far more than

the "special," which is longer and a trifle narrower, measuring inside 10x11x20. Some growers use the "special" for 128s only, its greater length permitting it to accommodate eight tiers nicely. The "standard" box contains 2,173.5 cubic inches, or slightly more than a struck bushel, and the "special" 2,200 cubic inches. The bulge in the top and bottom adds about 150 cubic inches to the capacity of each. The standardizing of apple boxes is a piece of legislation much to be desired, and one that would be welcomed by every honest and progressive grower. There is nothing now but sentiment to prevent competition slyly cutting down the size of the boxes, and no legal redress for honest packers if their neighbors resort to these practices, and thus undermine the reputation the former are striving to build up. And are not the interests of the poor consumer also worth considering?

There should be a national fruit package law prescribing the standard size or sizes of apple boxes. Some growers think one size sufficient, and this would of course save much annoyance if practicable; but more are inclined to think that two are necessary. Mr. C. H. Rogers, of Watsonville, California, president of the Pajaro Valley Fruit Growers' Association, writes me that the growers there use one box almost exclusively (9¾x11x20½), but that they feel the need of a different shape for the largest sized apples, and are now experimenting with boxes of various dimensions. Canadian laws, however, allow but one size, yet no serious complaints have arisen. This size, 10x11x20, was fixed only after a careful canvass of the horticultural societies and many growers showed it to be the general favorite. Mr. Maxwell Smith, Dominion Fruit Inspector at Vancouver, tells me that upon assuming duties two years ago he found no less than seven different sizes of apple boxes upon the Seattle market. This chaotic condition has doubtless improved since the enforcement of the Canadian law, but will never be completely abated until similar legal action is taken in this country.

Box shooks are usually hauled to the packing house or orchard and made up on the spot. To perform this operation rapidly, make a form by nailing two cleats a foot long on the work bench just the length of a side board apart, and about seven-eighths of an inch inside each of these nail another, thus making two slots to receive the end boards. In the same manner cleat a short board and nail it on edge just back of the cleats on the bench, meeting them at right angles. End boards thrust into these slots are thus held upright while being nailed. Box cleats should always be put on bottoms as well as tops, otherwise the thin boards are very likely to split and draw over the heads of the nail when the top is pressed into place. Cleats sometimes give a good deal of annoyance by splitting while being nailed, and in such cases should be soaked in hot water a few hours previous to using. Four four-penny nails on each end are much safer than three, both for sides and top and bottom, and cement coated or barbed nails are more reliable than the smooth. A good man can make up from 130 to 160 boxes per ten-hour day. The average cost of boxes in the flat is 10 to 13 cents

Fig. 4. The apron picking-bag in use

Fig. 22. Another orchard packing scene

apiece, but this can be reduced by ordering in carload lots. Some fruit unions obtain them of good quality as low as 8½ cents. The cheaper grades are frequently made of stuff so unsound that they are dear at any price.

Use only boxes that are freshly made up and material that is bright and clean. No man that takes pride in his business or cares for his reputation will pack fruit in old or soiled boxes. When hauling to market throw a tarpaulin over the load to keep off rain and dust. If box material is carried over from one year to another, it should be carefully covered to keep it clean and bright.

PACKING HOUSES AND FITTINGS.

A permanent packing house is a convenience too often dispensed with by growers, who make shift to pack in the open air where any inclement weather brings operations to a stop, and the packers are at best subjected to much discomfort from chilly mornings and evenings. The house may be cheaply made, but should have plenty of windows (which may even be covered with cloth), as the autumn days are short. A cheap but desirable construction is a lean-to against a south wall, securing the maximum of heat and light. The comfort of packers has a direct effect on the quality of the pack, and from a purely business standpoint is worth securing, even when they are working by the piece. Every large grower owes it to his business to have a well-built, light, and comfortable packing house.

The packing table is the most important item among the furniture of the packing house. One which stands free from the walls is preferable to a shelf or table built against them, as the latter arrangement makes it necessary to interfere with the packer every time the table is replenished. The table should be built to hold the apples themselves, not loose boxes of them. Common as the latter fashion is, it is utterly to be condemned, for the apples are not sufficiently spread out to allow the packer to choose the size he requires, but must be continually pawed over, to the irritation of the packer and the injury of the fruit. I have visited some places where the rattling of the apples in the boxes could be heard rods away; one might almost as well run them through a fanning mill! The common tables or benches partitioned off into compartments are a shade better, though far inferior to those provided with burlap or canvas bottoms. The best style of table I know of is the one in general use at Hood River, Oregon, and illustrated in Figure 18. It accommodates two packers and allows free access to the ends for refilling. The favorite size is three by four feet, as it allows any part to be reached by either packer, and yet holds plenty of fruit—that is to say, three or four boxes. A slight examination of the picture shown will enable anyone to construct the table in a satisfactory manner. The full length of the legs is three feet; they come up inside the frame flush with the top, but should be sawed off on a slope inward to prevent the corners bruising the apples through the burlap. The real

test of the proper height of the table is the height of the box when in position on the supports, as shown in the figure; if the packer's extended fingers just touch the lower inside corner of the box as he stands erect before it, the height is correct. Table legs three feet long usually fill these conditions. A board nailed across the end and another running across underneath serve to support the box at a convenient angle for packing. The latter board should, in addition to being nailed, be fastened with wire, or in some equally secure manner, as there is constant and often heavy pressure upon it. Commonly the box supports are arranged at diagonally opposite corners, so that each packer may have the table at his right; but, as many packers pack from the right or left indifferently, and find relief in changing about, many tables are made with three supports (as in the illustration), or four. The top of the table consists merely of burlap or canvas, which is tacked on loosely so as to leave considerable sag in the middle. It is an improvement if a double thickness of the cloth is used and the upper tacked at one end only, allowing dirt and litter easily to be shaken off. All the apples should be packed off the table about once an hour to prevent bruises wearing upon them. The danger of bruises may be lessened by edging the table with pieces of hose pipe thrust upon a stick. There are no high sides on this table to reach over, and the packer can remove the apples from its hollow as conveniently as a cashier can remove coins from the hollows of a cash till. Compare it with the table shown in Figure 22, and its superiority will be evident. The one in Figure 22 has a rim four inches high, the top being of canvas tightly stretched, since a sag would allow it to rest on the box supports which run across under the middle of the table. It is inconveniently large, being forty by eighty inches. To make it more portable it is not provided with legs, but rests on saw horses, and is equipped at each end with handles. (In the picture the handles are concealed by the lining papers which hang over them.)

One more piece of furniture—the nailing press—is essential to the equipment of the packing house. There are many types of these, from the crude, clumsy affair shown in Figure 22, to the highly effective one shown in Figure 17. The press shown in Figure 22 is a simple affair, but open to the same objections as a double clamp press. Now, turning to the press in Figure 17, which is in general use at Hood River, we find all of these objections are cleverely met. The box being placed in position on the press, the cover and cleats are clapped into place, and pressure on the foot lever brings all down tight, ready for nailing. The first pressure on the lever brings the arms inward, thus trueing up the cover boards automatically; then, as it descends further, the arms are drawn downward, clamping boards and cleats tightly to the box. The pressure is exerted directly over the box ends, and the claws which engage the cover are so spaced as to be entirely out of the way of nailing. The plan of construction of this press is given on another

page, and accompanied by a full description that should enable any grower to make one.

MANAGEMENT OF PACKERS.

Few men are fit to pack their own apples, as it is too hard for them to see the worm holes. No fruit union can afford to allow members to do their own packing, and even unorganized communities would benefit greatly by employing the same body of trained packers successively at the various orchards. Even isolated growers should endeavor, if their orchards are large, to train a group of expert packers and employ the same ones as far as possible year after year. This is the way to build up a reputation that has a cash value.

The success attained by the Apple Growers' Union of Hood River is so marked that it seems advisable to describe their system of handling packers. The latter are under complete control of the manager, who directs them daily where to go. When a member has picked enough apples to justify commencing packing, he notifies the office. This notice is listed with others, and packers are sent to the various places in the order of notification as nearly as practicable. It has been found very advantageous to organize the packers in crews of four, each headed by a foreman. Four packers make about the right number to handle the crop of the average grower; they just supply two tables, which are all the ordinary packing house will conveniently accommodate; and are as many as one foreman can attend to thoroughly. In some other localities only one foreman is provided for as many as a dozen packers, and too often confusion reigns. The foreman does no packing, but is kept busy seeing that every box is properly packed, and teaching and helping inexperienced packers. He sees to it that all are supplied with boxes, papers and fruit; that boxes when filled are promptly removed; and that everything goes smoothly. He stamps on the end of each box the number and name of the apples contained, and O. K.'s it with his own individual stamp. For small jobs, especially where there is room for only one to work, a single packer is detached from a crew.

The customary price for packing is 5 cents a box for grades larger than five tier; for the latter, and smaller grades, 6 cents. Under this scale of prices the apples must be placed on the tables wiped and practically free from culls. Wiping is essential where the fruit is sprayed late in the season with any mixture containing lime, not only because of the untidy appearance of the fruit, but the disagreeable suggestion to the consumer that it is poisoned. That no actual danger exists has been repeatedly demonstrated, but somehow this has not made the market very brisk for white-washed fruit. Some who spray with arsenate of lead find wiping hardly necessary, the deposit is so light; but it is a good plant to wipe at least all red apples, if for nothing more than to remove the dust. Apples which are allowed to go into a sweat before wiping are very difficult to manage, as the coating of spray becomes gummy and cemented to the skin. A pair of cheap cotton

gloves is much superior to a rag for wiping, as the operation is not only more quickly performed, but the hands do not become numb handling the cold fruit. Wiping and grading may be conveniently done at one operation.

If more than eight boxes in one hundred have to be culled out by the packers, an extra charge is made. Complete elimination of seconds and culls is of course highly essential to a first-class pack; nor is it so wasteful a process as some growers might think, but will often be found actually to be a measure of economy. Suppose, for instance, a man finds he has apples enough to pack 100 boxes if he is easy on the culling, but that rigid grading will give him only eighty. To choose the latter course may seem like a sheer waste of twenty boxes, but when he figures up the extra expense of packing the larger number, together with the lower price the ill-graded fruit brings, it will not take any special revival service to convert him to belief in the former course. The account might read something like this:

CULLED TO EIGHTY BOXES.

Receipts.

80 boxes apples at $1		$80.00
20 boxes seconds and culls at 30 cents		6.00—$86.00
Disbursements.		
80 box shooks at 10 cents	$ 8.00	
Making 80 boxes at 1½ cents	1.20	
Packing 80 boxes apples at 5 cents	4.00	
Freight on 80 boxes at 30 cents	24.00—	37.20
Net profit		$48.80

CULLED TO ONE HUNDRED BOXES.

Receipts.

100 boxes apples at 75 cents		$75.00
Disbursements.		
100 box shooks at 10 cents	$10.00	
Making 100 boxes at 1½ cents	1.50	
Packing 100 boxes apples at 5 cents	5.00	
Freight on 100 boxes at 30 cents	30.00—	46.50
Net profit		$28.50

These are conservative figures, and the difference in profit is apt to be more rather than less. Poorly graded apples are often difficult to sell at any price, but carefully sorted and packed fruit seldom goes begging.

Paying by the day would probably, under wise management, produce a better pack than by the piece, since the latter method to some extent puts a premium on haste and carelessness. It would be difficult, however, to arrange a just scale of prices under the day system, and some growers always lose money by this arrangement because they are not ready when the packers arrive, or have no conveniences or comfortable

quarters for them. This last objection proved so serious in the union at Hood River that paying by the day had to be given up, though at orchards where adequate preparations for the packers had been made the expense of packing a box was found to be only 4⅝ cents. Packers must be trained to the business, and seldom become really expert until the second or third season. Not every one can become a first-class packer, as it requires a naturally quick hand and good eye for size. Beginners should not expect to get more than half wages the first season.

STYLES OF PACKS.

There are a large number of styles of packing apples, varying with the taste and caprice of individual growers, but only a few of them are worth attention here. Perhaps the simplest is the adaptation of the old barrel pack of the East, in which the bottom and top are faced, the apples in the middle being simply poured in. It is a slovenly, not to say deceitful pack, requiring no grading except to sort out the big ones for facing. Fortunately it is seldom used, and then mostly for inferior fruit that is too small and low priced to justify anything better.

Of the better class of packs, in which each apple is put individually into place, the three sorts most commonly in use may be designated as the "straight," "diagonal," and "offset." The straight, or square, pack is made up of rows running straight across the box and presents perhaps the neatest appearance of any, but at the same time is severest on the fruit, as each apple is squarely opposed to its neighbors, instead of slipping into the recesses between them as in the other styles. It may be put up in three ways, as the size of the apples requires, which are called from the number of layers and rows in a box the three-tier (Figure 9), four-tier (Figure 10), and five-tier pack (Figure 12.) A six-tier pack is of course possible, but no one in the West cares to bother to pack such small stuff. The number of apples in the box in each of these straight packs may be varied considerably, but reliable men of long experience in the business assure me that no other numbers than those mentioned below are necessary if the fruit is carefully graded. All apples that can not be put readily into one of these will go into one of the diagonal packs and much confusion be avoided. These are the figures:

The three-tier pack (the largest apples packed) should contain forty-five apples to the box (five tiers long) or fifty-four (six tiers long.)

The four-tier pack should contain ninety-six (six tiers long), 112 (seven tiers long), 128 (eight tiers long), or 144 (nine tiers long.) The 144 is seldom used, but is occasionally necessary with very flat apples like the Wagener.

The five-tier pack should contain 200 (eight tiers long.) This is the smallest apple that most growers care to pack, though occasionally one puts up 250 (ten tiers long.)

It is one of the pretty points about the box package that the exact number of apples contained is always known, and, if stamped on the box, as it should be, gives information much appreciated by the buyer.

The "diagonal pack" (also variously called the "pear," "orange," and "diamond," though these names are more properly applicable to the "offset pack") is so called from the diagonal or oblique course taken by the rows. It is used for sizes intermediate between those suitable for the straight packs, and by some growers for all apples as far as possible which are wrapped. It should be used in preference to the straight pack whenever practicable, since the opposing of apples to spaces in successive layers protects them from bruises better than the straight style. Only two kinds of the diagonal pack are commonly used, the three-and-one-half and four-and-one-half tier, so named from the number of apples required to reach across the box. The former will go sixty-four, seventy-two, or eighty apples to the box; the later 150 or 175. No other numbers are necessary or desirable.

The "offset" or "orange" pack (Figure 9, at right) is similar to the diagonal—in fact, may be considered the diagonal with the rows running lengthwise (Figure 9, box at right.)

THE OPERATION OF PACKING.

A few years ago the crop of potatoes in the East was immense. Colorado, as usual, had raised many thousands of sacks, but found the price so low that it would scarcely cover the freight charges. In this emergency "the man of the hour" appeared in the person of a grower who packed his potatoes carefully, put them up in neat ten-pound sacks with an attractive label, and sent them on to Chicago. A fancy price was asked, but the stuff went off with a rush, and netted the grower the highest returns he had ever received. Cases similar to this are known to most farmers. Very often the manner in which fruit or vegetables are put up has more influence on the price than quality itself. Some of the details given below as essential to a first-class pack will seem to many needlessly elaborate, or merely fussy, but there is plenty of experience to show that they all pay handsomely. It is a little easier and cheaper not to line the boxes, use layer papers, or wrap the fruit, yet trifles like these make perfection—and fat pocketbooks.

The first item in a perfect pack is a clean box. As cooking recipes in old books sometimes quaintly begin—"Take a clean sauce pan," so the directions for packing apples might appropriately begin with—"Take a clean box." Get nice white box material and keep it clean. After placing the box upon the supports at the side of the packing table, which permit it to incline conveniently toward the packer (Figure 18,) the lining paper is put in. Lining papers are of cheap, soft stock, in width slightly less than the length of the box, and about twenty-six inches long. One sheet is required for each side, the two overlapping generously in the bottom of the box, enough being left outside to fold over the top (Figures 7 and 18.) To prevent tearing along the bottom

corners when the bottom bulges, a plait is folded into each sheet about six inches from the end. Packers do this very deftly by catching the paper at the edges so as to turn a fold into it, and crease it by drawing it swiftly across the knee. The plaits lie along the corners and provide plenty of slack. Next a "layer paper," consisting of a piece of thin but soft and spongy cardboard just the size of the box, is laid in the bottom. Then hang the paper hod on the edge of the box, if the apples are to be wrapped, and you are ready to put in the first layer of fruit. The construction of the hod for holding wrapping papers may be readily seen from Figure 7. To right-angled hooks in the edge engage the edge of the box, and a bracket beneath supports it against the side. It is by far the most convenient device for the purpose. To assist in picking up the papers, packers usually wear a rubber finger stall on the thumb or first finger. Practice enables them to wrap the fruit very rapidly. An apple is picked up in one hand while the other reaches for a paper (Figure 19, packer at left), the two are slapped together, as it were, and with a single dexterous twist the loose edges are gathered into a little bunch over the stem. It seems to take scarcely longer to wrap the fruit than to place it in the box unwrapped, so quick and continuous is the motion of wrapping and depositing in the box. Papers 10x10 inches are adequate for all but the largest apples. Frequently growers stamp their name on the wrappers, thus advertising it more surely, since middlemen sometimes paste their own box label over that of the producer. Many deem it unnecessary to wrap, and for many local markets it doubtless is, but for the Eastern and export trade it is all but indispensable. The wrappers make effective cushions, help to retain the aroma of the fruit if stored, and take up slack in case of shrinkage. They also impress the buyer with the fact that extra care has been given the product, and hence attract the best trade. The advisability of using layer papers is more open to question. They are not at present in very general use. California growers look upon them with disfavor, but at Hood River they are in universal use. In Washington they are seldom used. In the diagonal and offset packs they make an admirable springy cushion for each apple, as is well shown in the middle box in Figure 5, from which the side has been removed. In the straight packs this advantage disappears, but as an absorbent and in preventing the spread of decay the layer papers are highly effective, especially when wrappers are not used. The manner of putting up the straight pack is too obvious to need much description, though the judgment to know whether the apples on the table will go best into this or one of the diagonal packs is something that must be gained by experience. The apples may of course be graded so closely beforehand that each lot will pack into one size and style, but this is laborious and unnecessary with skillful packers, who from a large table choose swiftly and almost instinctively the right size. The apples should fit very snugly, yet if an apple at the end of a row has to be crowded in by main strength, either the packer has a poor eye for size or did not choose the right pack to

begin with. Let him spare the grower the anguish of seeing a fine apple crowded down against the side of the box till the skin slips.

The way to start the diagonal pack is clearly shown in Figure 5 and 7. It becomes still simpler by packing the box from the side, as some do, for then it resolves itself into the offset pack of each row alternating with, or offsetting, its neighbors; but it is much more convenient to work at the end of the box in all styles of packs. The box at the left in Figure 5 shows how to begin a layer of the three-and-one-half-tier pack. The two apples in the left hand corner are first placed diagonally across it, then one snugly in the right hand corner, and a fourth above and at the left of this wedges all securely into place. Then follow two more apples, as in Figure 7, and the layer has advanced for enough so that any one can finish it. In the middle layer two apples were placed across the right instead of the left hand corner, while the bottom layer is identical with the top, as shown, hence each apple in each layer comes opposite a space in the adjacent layer. When finished the box should present the appearance shown by the one at the right in Figure 5. The four-and-one-half-tier pack is started by placing an apple in each lower corner and one in the middle; two are then pushed down as far as they will go on either side of the middle apple, and followed by three more apples, corresponding in position to the first three, and so on until the layer is completely finished.

The offset pack is so simple that no description is necessary. The apples of the second layer should alternate with those of the first, that is, the first apple will be placed in the lower right hand corner, bringing it over the vacancy left by the bottom layer.

There is still one important feature of a good pack that has not been mentioned, and that is the crown or bulge in the center. This is a bugbear for the beginner, as it is difficult to make the end rows come flush with the ends of the box, or slightly above them, and yet have the center about an inch and a half higher. To secure a proper crown it is often necessary to turn part of the apples in the middle layer, or layers, flatwise, if being packed on cheek, or vice versa, yet skillful selection of the larger apples for the center will usually make this unnecessary. In the case of very large apples it is sometimes impossible to bring them low enough at the ends, as in the box at the right in Figure 15, and then it becomes necessary to lay a cleat at each end under the cover. Frequent resort to this, however, is strong evidence of faulty packing, and is not permitted by most growers. The box at the left is properly crowned. A crown of an inch and a half gives a bulge at top and bottom, when the cover is nailed on, of three-quarters of an inch, which experience has shown to be about right (Figure 16.) A greater bulge means too severe pressure on the fruit; a less, too great danger of its becoming slack. In a properly packed box the apples in each layer should be so snugly fitted into each place that when the hand is placed upon them and an attempt made to move them back and forth, there

Fig. 19. Packers at work at table. The foreman stands at the rear by the cull-box

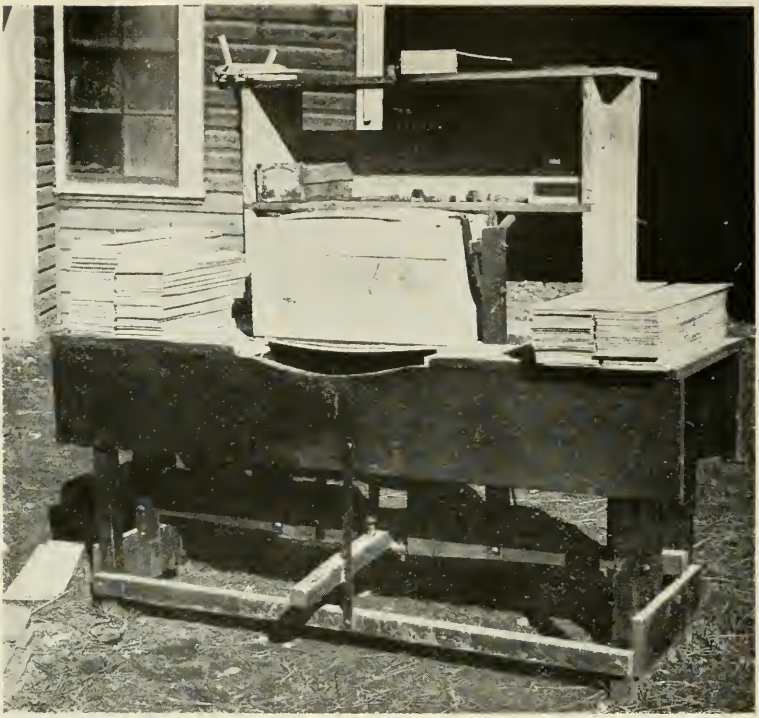
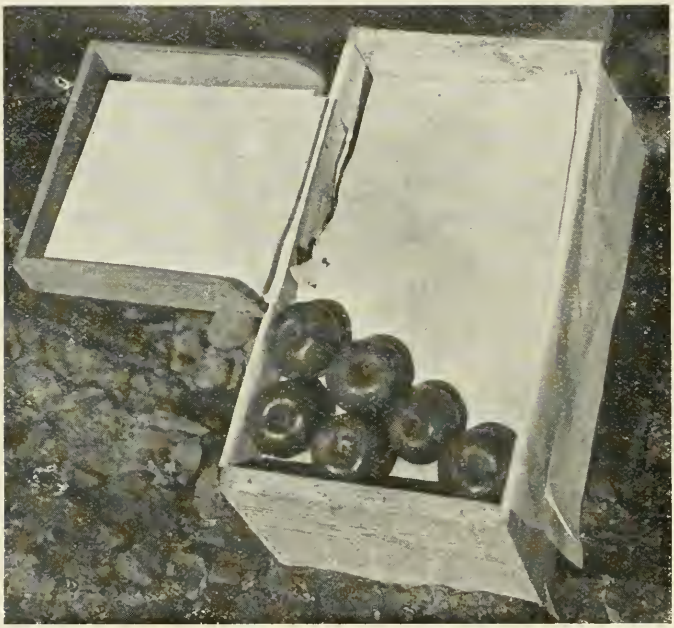


Fig. 17. Nailing-press, best type

Fig. 18. Good style of packing-table



Manner of starting a three-and-a-half-tier box

Fig. 9. Three tier, four tier, and set-off packs, unwrapped

Fig. 5. Three-and-one-half tier Yellow Newtowns, the middle box opened on side

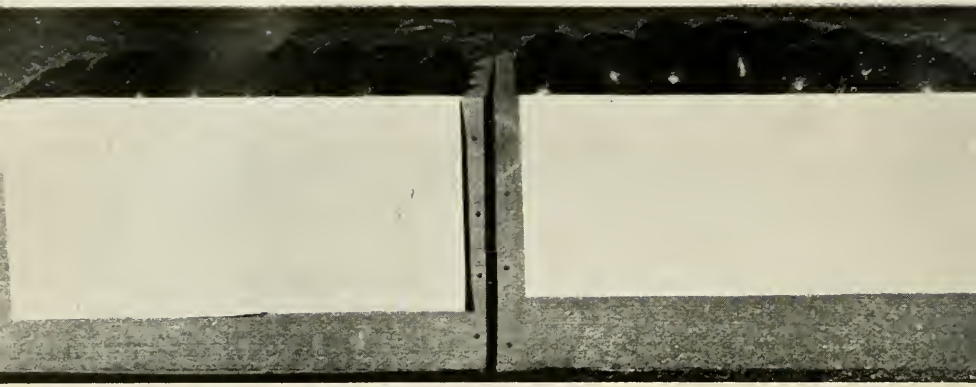


Fig. 15. Profile of two packs, showing proper crown

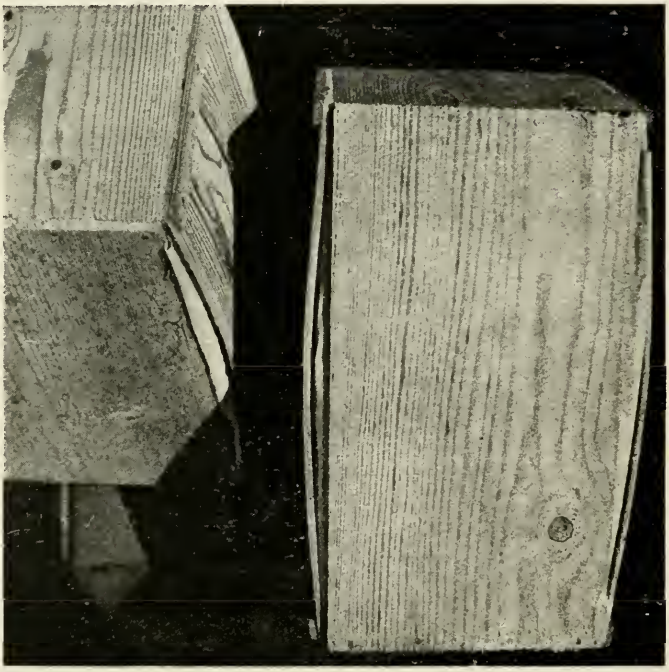


Fig.16. Side view of boxes after nailing, showing proper bulge in top and bottom

Fig. 23. Manner of packing boxes in a car

should be no perceptible slackness. Yet if there is no bulge, an otherwise perfect pack soon becomes slack from handling and shrinkage.

Two essentials of a perfect pack are honesty and uniformity—that is, the apples in the middle or bottom of such a pack are just as good as those on top, and all perfect; all are of an even size and properly colored; and every box is packed with the same degree of care and skill, so that the buyer may feel certain that it is a case of "one seen, all seen." Too rapid work is frequently responsible for faulty packing, especially where the oversight is not thorough. It is reported from some places that packers put up more than 100 boxes per day, but it is safe to say that even the most expert can not put up more than seventy-five perfect boxes in ten hours, and very few can do more than fifty well. The latter figure means good wages to the packer. Ease and dispatch in packing are much conditioned by the preliminary arrangements. If the equipment is good and everything convenient, the results will be far more satisfactory to all concerned. Attractive labels shown in Figure 23 add much to the appearance of the boxes, and are a valuable means of advertising and building up a special trade. Whether labeled or not, however, the box should be marked on the end with the name of the variety, the number of apples contained, and the grade, especially if the latter is anything but "first." At Hood River they add to these marks the name and number of the grower, the number of the packer, and the number of the inspector. Under-colored fruit is also marked "L" for "Light." Each packer is assigned a number for the season and provided with a stamp with which he stamps it on each box as completed. He also marks with pencil the number of apples in the box to guide the foreman, who does the rest of the stamping. Under this system faults are easily traceable to the committer, and incompetents weeded out. The inspection of the foreman is a check on the packers, and one on the foreman may be had by the grower opening a few boxes out of every hundred at random; or in case of a fruit union, this may be done upon delivery at the warehouse.

The marking of fruit packages is a proper subject for legislation. Not till false or misleading marking is visited with a legal penalty and the law enforced by rigid inspection, will the honest packer and the consumer be properly protected. Such a law, known as the Fruit Marks Act, has been in successful operation in Canada some four years. Every grower should work for such a law in this country.

In piling and hauling the boxes care should be taken always to lay them upon their sides, as the bulge in top and bottom allows the fruit to be easily bruised if piled upon the latter. This precaution is especially important when loading into cars.

Considerable labor is involved in loading a car. Free circulation about the boxes, together with perfect immobility, must be secured. Figure 23 shows how this is accomplished. A row of boxes is laid across the car with a space of several inches between each, and strips

reaching to the sides of the car nailed along front and back edges, thus securing every box against any sidewise motion, and also providing an air space between this row and the one above. A generous space should be left at the top of the car where the warm air gathers; six rows high is quite enough for the ordinary car, and many prefer to make but five. When the car has been filled to the door from either end, it must be braced against the severe endwise thrusts incident to frequent stopping, starting and switching. Two-by-fours make the best material for this bracing. Uprights are stood in front of each tier of boxes on either side, and nailed lightly in place; across these three pieces are nailed, one on the floor, one near the top, and one in the middle. Braces are then cut just a little too long to fit between opposite cross pieces, driven home with a maul, and securely nailed. Four or five braces are thus wedged into place between each pair of cross pieces, holding every box in place as in a vise. A car will hold about 600 boxes.

THE APPLE: FROM NURSERY TO PACKING TABLE.

An address delivered by A. I. Mason, Horticulturist, of Hood River, Oregon, at the meeting of fruit growers held in the Rogue River Valley, Southern Oregon, September, 1906.

I have been requested by Brother Withycombe to tell you how to put first-class, high-grade apples upon the packing table ready for market, and then my colleague, Brother E. H. Shepard, will tell you how to handle them in order to receive the greatest profit. If it were possible for Brother Shepard and I to do all that Brother Withycombe has requested us to do, our mission on earth, in a horticultural sense, would be complete, and it could truly be said, "Well done, thou good and faithful servants." The duty assigned to me covers a field of thought which is so broad, and embodies so many topics, upon any one of which a good-sized paper could be written, that it will be necessary for me to touch only briefly upon the principal topics and some of their most important details; and whatever views I might express shall be limited to those obtained by personal experience and observation during the last ten years while growing an apple orchard in Hood River Valley. And I shall ask you to make all necessary allowance for our soil, climate, and market conditions, which may be entirely different from your local conditions.

The first thought in the mind of a prospective fruit grower is to select his location. Now, we Hood River people when away from home are rather timid in regard to our solicitations; and would say to the prospective horticulturists, if there is not room for you in Hood River, by all means go to Rogue River. The next duty for a prospective hor-

ticulturist is to determine what varieties are best adapted to his locality, considering soil, climate and market conditions. Before you plant an apple orchard, you should know just what varieties will reach the highest excellency in your district, and return to growers the greatest profit. Don't make the common mistake of planting too many varieties in a commercial orchard. One variety, if it is a self-pollenizer, may be more profitable than a half dozen mixed varieties. Under no circumstances would I advise the planting of more than two or three varieties in any commercial apple orchard. In my orchards I have just two varieties, the Esopus Spitzenberg and Yellow Newtown.

There are several systems for laying out and planting an apple orchard, but I prefer the hexagonal, for several reasons, among which I will mention but the two most important. First, it gives a more equal distribution of trees over the ground. Second, it gives a better opportunity for thorough cultivation and spraying. It has been truly said that you can not dig a tree hole too deep or too broad. Twenty inches deep and thirty-six inches across is about the average size of holes dug before planting the apple tree in our valley.

When you plant an apple tree, be sure to set it so the main roots will be at least six inches below the top of soil. Go into any old orchard and you will find many trees were set entirely too shallow. The roots near the trees are either bare or so shallow that the cultivating instruments are constantly damaging them.

My experience has taught me that if soil is in good condition during late fall or early winter, then is the best time to set a tree. The first season's growth of a tree set in the fall will be far greater than when set in the spring. The distance apart to set trees varies with local conditions. In our valley they should be set at least twenty-eight to thirty feet apart; while in the Willamette Valley they should not be less than thirty-five to forty feet apart. The lower altitude, their longer growing season and extreme moisture produce a much heavier wood growth, and I might add, a later bearing tree. I believe in deep and thorough cultivation. You can not plow your orchards too deep while trees are young. I have plowed my orchards twice, when trees were small, to a depth of sixteen inches, by using a sub-soil plow, and I have every reason to believe it was a paying investment of both labor and money. Fellow fruit growers, I am ready to defend this assertion, that any apple orchard, in any country, and under any climatic conditions, should have clean and thorough cultivation during the summer months. Cover crops are very beneficial and almost indispensable; but during the fall and spring is the only time to grow them.

Give the trees the benefit of all nutrition and moisture contained in the soil while the fruit is growing.

It has been said that cleanliness is next to godliness. So it is with the apple orchard. Cleanliness will do much good toward retarding the growth of fungi, the spread of insect pests, or the encroachment of many orchard diseases. Old dead weeds around the trees, props left

lying on the ground, or standing under the limbs all winter, old birds-nests in the trees, and the ground covered with wormy and diseased apples, all go to tell me that such conditions are detrimental to the best interests of successful horticulture. It is very necessary and beneficial to give the bodies of your apple trees a general annual cleaning during the early part of spring. The loose, rough bark should be scraped off, and the old wounds cleaned out and thoroughly waxed. And right here I want to advise you to stop using paint, or anything other than good grafting wax on any wound on an apple tree. Saw off a large limbs, paint the wound, and one year afterwards you will find the outer part of the wound looks all right; but upon investigation you will find that dry rot has begun about one quarter of an inch under surface of wood. If the same wood had been covered with good grafting wax, it would have been in a state of almost perfect preservation. To make a good grafting wax, melt together four pounds of resin, two pounds of bees-wax, and one pound of tallow. Before using, thin with turpentine. This wax can be used when cold. After the bodies of trees are thoroughly cleaned and wounds waxed, I deem it advisable to give them a cover of whitewash. Now, don't imagine for a moment that this will stop up all pores of the bark and forever ruin your trees, as many people advocate. One week after the wash is applied it is more porous than the bark. I have experimented for the last five years upon the making of this wash; and while the following formula may be improved upon, yet it is the best of all that I have ever used. Dissolve one pound of resin with one pound of concentrated lye. Add to this ten pounds of lime just after you have slacked it. Then add enough water to make paste suitable for whitewash, after which add one quart of flour made into good starch.

This wash will clean the bodies of trees of all fungi growth or insect pests. It will protect your trees from extreme heat of the sun, hence avoiding any sun-scalded trees. And it will lessen the evaporation of sap while passing from the roots to the top.

If you should be so unfortunate as to get some trees untrue to name, or make a mistake in your judgment when you first set your orchard, and finally discover that you have an orchard of undersirable and unprofitable trees, don't wait for years before you change them, but do it at once. If your trees are not strong bodied dig them up and set others; but if they have strong, healthy and vigorous bodies, by all means graft them. I prefer the side graft. A split graft leaves a decayed place in the tree. The budding does not make so strong a union as a side graft. Don't let some one make you believe it does not pay to graft, that you had better dig out the objectionable trees and set in new ones.

I have in my orchard over seven hundred grafted trees, which are just as pretty as the picture I will show you. But don't imagine that you can stick the grafts into the trees and have no further trouble. It takes constant care and attention to grow a well-balanced top upon a

grafted stalk; but you will be well paid for all your trouble. My experience in changing trees has been limited to those from one to eight years old, and I would not ask for better success.

The cultivation of an apple orchard while the trees are small is easily managed; but after the trees have become older and larger, it requires different instruments in order to do thorough cultivation, especially in a low-topped orchard. I discard the use of the plow in my orchards after they are six years old, and thereafter use the disc. The plow lifts and tears the roots, leaving them very ragged, and oftentimes exposed to the sun. It also leaves a wound very susceptible to crown gall.

The disc harrow cuts the roots smoothly, and leaves all injured roots in a splendid condition for immediate new growth. But do I hear some one saying, "You can not go deep enough with a disc harrow." Ah! my brother, I believe in deep cultivation, but if you will weight your disc harrow and put on some extra horse power you can surely get it. All cultivating instruments to be used in working an old orchard must be very wide in order to be successful. Here is my list of instruments: An eighteen-inch disc that cuts five feet, but may be extended to thirteen feet; a three-section smoothing harrow that covers thirteen feet; a home-made leveler that covers twelve feet; a two-section clod smasher that covers twelve feet; a spring-tooth harrow that covers five and one-half feet, but may be extended to eleven feet; and a New Kimball Orchard Weeder, fourteen feet wide, which cuts only four feet on each end, and leaves a six foot space in the middle. This space is cut out afterwards with an eight-foot Kimball Weeder.

With these sized implements, you will have but little space left around the trees to cultivate with a hoe. I desire to add here that the Kimball Weeder is the best dry weather instrument I ever saw. It absolutely cuts and lifts all the dirt, letting it drop back without exposing any moisture to the sun. As a weed killer, it is unexcelled. In our climate we try to keep a dust mulch in our orchards from three to four inches deep during our summer months. If there is any part of orcharding upon which I am an enthusiast, it is cultivating and pruning. When I was a boy I was taught that a good corn grower never waited for weeds to grow before he repeated the cultivation. Just so in cultivating an apple orchard. Keep the molecules of earth loosened and you prevent the penetration of the sun's rays, the loss of moisture from your soil, and literally instill vigor and life into your trees.

A few days ago I passed through a young orchard (and I am ashamed to admit it was in our own valley) which caused me to wonder why some people could expect success. The trees were one year old when set last spring. They had been topped from three to three and a half feet high, so the sap during our hot days could have time to become almost boiling hot, and to lose a large per cent by exaporation before it finally reached the top where it had forced out a small, sickly growth from two to six inches long. The weeds were quite numerous, and had

thrived all summer. In fact, they had been cultivated a little at one time, if I am not mistaken, and the moisture of the soil—well! I guessed that it was somewhere below for I could not find it. I stood and gazed and said to myself, "Is this man crazy?" The answer came back, "No, he just hasn't time." Fellow fruit growers, I hope Rogue River has no such orchardists. But I expect you have. If so, I don't believe he is here to-day, for he hadn't time to come. But when you meet him, try to impress this thought upon his mind, that the orchardist who hasn't time to do his work well should change his vocation at once to something where thoroughness in every detail is not so essential.

Of all the duties that have been forced upon me since I began growing an apple orchard, that of pruning has been the greatest problem for me to solve. And if I should differ radically upon this point from many of you, just pass this part of my paper into the waste basket until you have time to come to Hood River and visit my orchards.

Mr. Chairman, I want to be put on record as being unalterably in favor of a low-topped and hollow-centered tree. Also as a firm believer in using the pruning shears diligently and intelligently until I get a tree which can produce and support fairly well its own fruit. In other words, I believe in getting a tree first, and fruit will surely follow. But if you permit a young tree to grow with but little pruning and bear heavily while young, you will never have as large, strong, vigorous and prolific a tree when it becomes old. I top my one-year-old trees when I set them, from eighteen to twenty inches high, always cutting top so terminal bud will be toward the wind. About July 15 of the first year I prune out my trees so as to leave from three to four upright stalks as near in a circular shape as possible. I then cut back these upright stalks to about eight or ten inches. This summer pruning prevents the trees from getting top heavy, and forces them to grow a more stalky body, and also gives them at close of season an advanced growth in the desired shape of top. The following spring I cut out all inside growth, but do not top. In fact, I believe that it is necessary to have two pruning seasons—one during the winter and spring, to thin out all undesirable growth, the other during the latter half of July, to cut back all extra long growth.

The successful apple grower must study the nature of every variety of tree in his orchard, in order to become a practical pruner. I find that the Yellow Newtown should be cut back but very little after it has entered its third year's growth. But I can not grow an Esopus Spitzenberg so as to make it carry its fruit well, and maintain a strong and shapely tree without topping it almost every second summer. I presume some of you want to know why I prefer a hollow-centered tree. Here are some of my reasons: First, it gives more light and air into the center of the tree where the fruit most needs it to obtain high color and better keeping qualities. Second, it gives more room to get into the center of the tree to thin, pick and spray the fruit. Third, it gives a perfect system of uprights, when properly fastened together, to which

all other limbs can be fastened, hence making a top far stronger than any other system of supporting the tree when loaded with fruit.

I feel as though it would be time wasted for me to state the many reasons why I prefer a low-topped tree. Such reasons as convenience in thinning, spraying, and picking the fruit; in protecting the body of the tree from extreme changes of heat and cold, and the protection of both tree and fruit from being damaged by heavy winds. All these reasons, and many more, are so plain that I wonder why any progressive fruit grower would ever think of growing a high-topped tree.

The subject of spraying is one of much interest to every apple grower, and one upon which a whole volume could be written. However, I shall only make a few general suggestions. This part of orchard work, more than any other, demands extreme thoroughness in every detail. If you spray, do it well or not at all. A poor job of spraying is labor and money wasted.

A few weeks ago I received a letter of inquiry asking my opinion upon the following questions, which were to be read at the Pacific Coast Nurserymen's Association, held at Tacoma, Washington. First, can an orchard badly infested with San Jose scale be given one thorough spraying with the proper remedies and be entirely eradicated of all scale? Second, has not the time arrived when it is advisable that every orchardist in the Northwest should spray for San Jose scale every season? My answer to these questions, briefly told, was this: First, it might be possible, but hardly probable, that one spraying would eradicate all scale. Second, every orchardist should spray with the sulphur and lime spray, or something equally as effective, every spring, just before the buds open, and those who do not and will not should be made to by strict enforcement of strong horticultural laws.

For several years I have sprayed with sulphur and lime late in the spring, just before the buds opened, and as far as I know I have never had a scale in my orchards. In this respect, I believe in the old adage, an ounce of prevention is worth a pound of cure.

A few days ago I received another letter, this time from the editor of the *Spokesman-Review*, at Spokane, Washington, asking for my opinion upon the criticisms made against the fruit inspector at Salem, Oregon, because he condemned some peaches which were slightly affected with the San Jose scale. His letter closed with this very important question: "Is it practicable to allow the growers any leeway in this respect?" Here is my answer in short: Thorough, diligent and intelligent spraying will practically eradicate the San Jose scale. It is easier to control in our valley than the codling moth. No leeway should be given. It would be absolutely impossible to frame a law giving any leeway in selling diseased fruit, which would give satisfaction to either the producer or consumer. It would be greatly abused by the growers, and would ever be a source of trouble for the fruit inspectors.

I have used several formulas for mixing sprays with which to exterminate the green aphis, but I find that one pound of whale oil soap

and one pound of quassia chips to eight gallons of water gives the best results.

For fighting the codling moth, most all apple growers in our valley are now using the arsenate of lead sprays. We are well satisfied with the results, after two years' trial, and will look with suspicion at first upon any one who clams to have discovered a better spray. The advantages of this spray over the arsenate of lime or the paris green sprays are many. It is less trouble to prepare. It remains in suspension much longer. There is absolutely no danger of burning the most delicate foliage or fruit. It harms neither man nor beast when applying it. It is much easier to apply. It flows through both pump and nozzle very smoothly and causes but little wear on either. It will not wash off easily by heavy rains, and yet when dry rubs off very easily. The labor saved in wiping the apples at picking time will more than pay the difference in the cost of spray. It requires a less number of sprayings, and gives better results in the destruction of the moth.

Most of us are trying to follow the advice of Prof. E. D. Ball of the Utah Experiment Station in fighting the codling moth. However, I modify his advice a little in applying the first two sprays. Instead of waiting ten days between the first and second sprays, I do not believe we should wait longer than four days. If petals have mostly fallen when first spray has been applied, we can not wait ten days to apply the second spray and find the calyx of the center apples in each cluster open, and it is these center apples which we mostly leave when thinning. I have sprayed with arsenate of lead six times this season. The dates are as follows: May 7, May 10, June 1, June 25, July 20, and August 20.

The first two sprays were made to fill the calyx end of the apple with poison. The next three sprays were to keep the outer part of the apple covered with poison while it was expanding with growth. The last spray was to give a farewell banquet to the second brood of moths.

I believe I wasted one spraying; the third, fourth and fifth sprayings should have been merged into two sprayings. But our climatic conditions last spring and early summer were such as to cause an uncertainty in just when to spray, and I would rather spray too often than not often enough. I have less than one-half of one per cent of wormy apples in my orchard this year. But this record can not be expected every year. Owing to our late season cold, cloudy, and rainy weather last spring, it seems that the first brood of moths was very light, most of them never hatching.

In regard to the most desirable power to use in an orchard for spraying, I would say it is a difficult question to decide. The carbonic gas, the gasoline engine, and the small steam engine all have their friends, but I intend to purchase a small steam engine sprayer next spring. I believe it has many advantages over both the others. The principal one being the cost of operating. This is almost nothing compared to either of the other two. Its agitation is perfect, and the steam can be

Avenue in A. I. Mason's Apple Orchard, Hood River.

blown through every pipe, hence making it very convenient for cleaning purposes, especially when using our sulphur and vitriol sprays.

Now, I presume the most of you know all about thining apples. However, I may be able to make a few suggestions. Thin absolutely to one apple on each fruit spur. If tree is too heavily loaded, leave no two apples closer than four inches apart. Do not forget to thin early; yes, very early, the earlier the better, if you want size to your fruit. The apples thin easier then than at any other time. No scissors or clippers are needed. Thinning early will force a larger growth into the remaining apples than if the whole cluster of five or seven remained on the same fruit spur until they were the size of walnuts.

Begin to thin when the apples are about the size of hazelnuts. This is just a few days after you should have applied your second spray. At this time they will snap off very easily at the outer end of stem. Some growers let their apples get as large as walnuts before they begin thinning. By this time the stem has become very tough, and will not break off easily at outer end, but will split off very easily at the base end. This they do, leaving the base of stem on remaining apple almost entirely surrounded with small scars or wounds. The growth of this apple must then be restricted until nature restores the injury. But some claim that the little stems left around the apple will scar it. This is only theory. On many varieties they will drop off entirely, but on the Esopus Spitzenberg many will remain all the season. For the last three years I have thinned all my apples by breaking them off at the outer end of the stem, and I have never found an injury caused by the remaining stems. It is only occasionally that one of them touches the apple, and if it should it is so small and weak that it can do no injury.

I feel as though this paper would not be complete if I did not say something about propping and tying up apple trees when too heavily loaded with fruit. I discarded all tree props in my nine-year-old orchard last season. Some of my neighbors said, "You can get along all right this season when the crop is very light, but wait until you get a heavy crop." Well, I have a heavy crop this year ,and still have no props, and as far as I can see, I am all right yet. It sounds nice for an orchardist to tell you that he prunes and thins until his trees will carry all their fruit. I don't do that, and I doubt if many do in our valley. However, I believe in heavy pruning until I get a tree with a large, strong, and well-balanced top, and a short, stout body. But with all of these precautions the apple tree in our valley will bear entirely too heavily, especially while young.

This being true, many limbs which are too heavily loaded must be supported by some artificial device. As previously stated, I grow nothing but a hollow-centered tree. The main upright stalks, which are generally from five to seven in number, are fastened together about ten or twelve feet from the ground with screw-eyes and No. 12 galvanized iron wire. I also use a three-quarter inch galvanized harness ring

in center of tree, to which all wires from main stalks are fastened. When this is done once, it is done for all time, during the life of the tree. I then have a structure perfect in shape, and unexcelled in strength. To this structure, which is a cylinder of limbs from three to four feet in diameter, I tie up with strong twine all other limbs that are too heavily loaded with fruit.

I might add that out of four different kinds of twine that I have used this season in tying up apple trees, I find that American spun, two-ply, tarred hemp is the best and the cheapest in the end. The labor in tying up a tree is the greatest expense. This tarred hemp will last at least three years, after which the limb is either strong enough to carry its load or large enough to receive the screw-eye and wire. After my trees are supported as above described, it seems almost unnecessary to state the advantages over the old method of using props. The trees will remain in a better shape; fruit will be more uniform in color; no risk of wind blowing down props, hence causing limbs to break. A less per cent of fruit will be limb rubbed or blown off. You will have no props to interfere with cultivation, no props to rub off half the bark where it comes in contact with the limb. And there will be no props to haul in and out of your orchard each year. I might add under this topic that the best method of tying two limbs together is to encircle both limbs within one loop. This will require more twine, but will always retain the limbs as desired, and will not embed itself into the bark of tree so badly. The swaying of limb with wind will keep it loose, and as soon as the fruit is removed, the twine and bark will be loosened or entirely separated. This system of building and supporting a tree is rather difficult to explain on paper so I will now illustrate it with a model tree I have brought with me. I also have with me some photographs of trees heavily loaded with fruit, which show them carrying their burden and yet remaining upright and shapely.

In picking your apples you should be careful in every detail. Pick all apples as soon as they have attained their proper size, color, and maturity. Do not pull off the fruit spurs, thereby destroying next season's crop. See that your pickers do not bruise the apples. Handle them as if they were eggs. I do not like the common practice of picking apples in a bag tied over the shoulders or around the waist. Every move of the body moves the apples in the bag. Every time you lean against a limb, or come down the ladder and let the stack strike against the steps you are bruising the apples. While these bruises are small and may not be noticeable to you, yet the cold storage commission man at the other end of the line will discover something is wrong. Your apples will not keep well, and hence will not give satisfaction. The next season he will seek other fields in which to buy, or worse yet, offer a much lower price for your fruit.

It is a very common practice to pick apples into the same boxes in which they are to be shipped. If this must be done, do not let your

boxes set on the ground. Keep them clean. A better way is to use only the regular orchard picking boxes.

I use a little skeleton table twenty-eight inches high, with the top just the size of an apple or orchard box. Upon this table I set the box while picking from the lower limbs. With low-topped trees, at least one-third or one-half of the fruit can be picked while standing on the ground, and be placed in the box on this table. They are light, easy made, and very convenient. It saves your back from stooping over to place the apples in the boxes, and it saves the re-handling of your fruit from the picking basket, bucket, or bag. I find that a galvanized iron bucket, made to order, ten inches wide and ten inches deep, with straight sides and a hook attached to the handle, is very convenient for picking apples. I have experimented with several different styles of patent step ladders, but nine times out of ten the picker will take the ladder that sets the most solid upon the ground. This is generally a common, home-made step ladder, with three or four legs, made so as not to fold together. These ladders are practical only when not over seven or eight feet high, and when used in working around the outer part of trees.

For thinning and picking the top and inner part of trees, I find nothing so convenient as two tripod ladders set on opposite sides of the tree, with a light and strong plank laid through the tree, with ends resting upon the top or the round on inner ladder of each tripod ladder. I have with me a photograph of these ladders in service, which I will take pleasure in showing to you after this meeting is over. You will notice that this is another point scored in favor of an open-topped tree. These ladders could not be connected very conveniently with this plank if the tree contained large center limbs; and besides, you could not get into the tree to work with any convenience.

In thinning and picking off of these ladders in my orchards, three persons can and do work with perfect ease and safety. When you pick your apples, do not throw any culls on the ground in order that you may have the opportunity to get down on your knees in the dirt and mud a month later to pick them up. When I pick a tree, I leave the ground beneath it, as well as the tree, clean of all fruit, it matters not how badly damaged. After your apples are picked, do not store them away before wiping. After an apple sweats, it will cost twice as much to wipe it. Especially the Esopus Spitzenberg. I have wiped them when they cost me ten cents a box, just because I had let them set awhile after picking. The best contrivance that I have found for wiping apples is mittens made of Turkish toweling. Lay your hand on the cloth and mark around it leaving one-half inch for seam, cut to mark and then stitch up on sewing machine. It will take about five minutes to make a pair of these mittens. If you will try them, you will always use them. Each wiper should have two or three pair. While wiping your apples, be sure to cull out all wormy, scaly, scabby, bruised, mis-shapen, or otherwise imperfect apples. This is a good time to separate your sec-

onds from the culls. It is just as easy to place a cull apple where it belongs as it is to throw it in a box where all are mixed together. I believe I am now ready to put my apples upon the packing table, and if my colleague, Brother Shepard, does not get me the best price ever paid for apples anywhere in the world, I shall be greatly disappointed in his ability as manager of two of the best fruit growers' unions on the Pacific Coast.

In conclusion, I desire to say there are many other topics, such as cover crops, fertilization, irrigation, drainage, other orchard pests, and diseases, all pertaining to the growing of the apple. But time and your patience forbid me to continue longer. If there is any part of my paper that you desire to have explained more fully, I shall be pleased to do so at any time to suit your convenience.

HISTORY, CULTURE, AND HABITS OF THE STRAWBERRY IN HOOD RIVER.

By C. D. THOMPSON.

The history of the strawberry, commercially considered, dates from the introduction of the Clark's Seedling.

Sometime in the early eighties a few plants of the variety then known as Clark's Early were cultivated here, but for lack of proper attention nothing of consequence came from them.

This variety was originated near Portland, Oregon, by Mr. Fred E. Clark, a gardener and fruit grower.

In the fall of 1883, Hon. T. R. Coon, now of Lyle, Washington, came to Hood River to seek rural pursuits, and he immediately secured and planted several varieties of strawberries for the purpose of experimentation. Clark's Early was among those selected, and it proved to be the only one of any promise. In 1884, Mr. Coon sent a crate (twenty-four pounds) of this variety to Portland to market, and received in return $9 and an inquiry for more of the same kind. The year following, he began shipping them into Montana; and other farmers, seeing the possibilities for the future of the strawberry business, began growing them, and from this small beginning rapidly developed a great industry within a short period of time, amounting recently to as many as 107,000 crates in a single season, and bringing a return of as much as $175,000.

This variety later assumed, and now locally bears the name of Clark's Seedling. In other localities, however, it is known as the Hood River, and is shipped as such. A peculiar fact in connection with this berry is that it proved of no value whatever in the Willamette Valley, its place of origin. Another more interesting fact is that while it has been tried in almost every section of the United States, it has never proved equal

as a shipper, nor reached the same degree of perfection in any locality as here; and in many places, in fact, has nearly always proved an entire failure. In a few instances, it has succeeded sufficiently well to supplant all other varieties. Soil and climatic conditions here seem to be just what are needed for the perfection of this particular variety.

Many attempts have been made to introduce other varieties here, with a view to finding one that would be of equal quality both for table use and as a shipper; and at the same time be a heavy producer. The latter has been accomplished, but the former, never, and all other varieties have been discarded after a few trials of shipping them along with the Clark's Seedling.

The harvesting of the strawberry crop usually begins from the 10th to 15th of May, and lasts until the middle of July. Perhaps no other strawberry section enjoys so long a season. This is on account of the land lying in benches, those on the lower lands near the Columbia ripening first, and those on the higher benches coming successively later. Sometimes it is as long as a month's time between the first ripening on the low lands and the first on the highest benches.

During the picking season thousands of people come from other localities and enjoy an outing and pick strawberries. This makes lively times in Hood River.

The picking is done in hand carriers containing six one-pound boxes. After a carrier is filled it is immediately taken to the packing house, where the berries are turned over to the packers (usually women,) who cast out all over-ripe, green, and irregular shaped ones, replace them in hallecks, and face them on the top with berries supposed to represent those underneath. They are then placed in crates, and each evening delivered to the shipping house; where, if they are to be shipped long distances, they are placed in refrigeration, and then sent to almost every market in the North and Middle West, going to Montana, Idaho, Utah, Washington, North and South Dakota, Minnesota, Nebraska, and sometimes as far as Massachusetts and Alaska.

These long shipments are possible only from the fact of the extreme firmness of the berries, which allows them sometimes to be on the way to market as long as eight or ten days, and yet arrive in good condition.

CULTURE.

Plants for setting new beds are usually secured by allowing the runners to set on young, vigorous plants. These may be dug any time after the roots have begun to form, but generally in September or October, or they may be allowed to remain in the ground until spring. Before setting, the plants are trimmed, both top and root. Great care is taken to set the plants firmly in the ground, especially if done in the fall, as they are liable to heave during the winter. Most of the planting is done in the fall; not, however, because this is better than spring setting, but because the grower usually has more time for the work. Spring, no doubt, is the better time for setting.

Plants are commonly set in rows, thirty-two or thirty-three inches apart, and from thirteen to fifteen inches apart in the rows, making about 14,000 to the acre. Great care should be taken in preparing the soil for planting. It is absolutely essential that the ground be graded, on account of convenience in irrigation. One who attempts to irrigate without first grading finds himself *making water run up hill.* The ground should be plowed deep, and harrowed well to get rid of all weeds and make a good plant bed. Thorough cultivation, both with horse and hoe, is essential to successful crop production. The greater portion of this work is done after the picking is over. A short period of rest is commonly allowed after picking, no other attention, perhaps, than watering being given. Then the plants are topped and the weeds cleaned out. The topping aids very materially in clearing out the weeds, stimulates the plants to vigorous growth for the year following, then, during the remainder of the season, they are thoroughly cultivated, watered, and all runners kept cut until some time in October. The five-toothed cultivator is the one in most common use.

The spring cultivation is not so extensive, consisting of perhaps cultivating twice, and hoeing once or twice. This should be light, and not so near the plants as to disturb the roots and arrest fruit development. No work should be done among the plants after the fruit begins to set. Irrigate only as the season demands. The irrigation is kept up vigorously during the picking season. The proper summer care makes the crop of the succeeding year.

Plants set in the fall will produce a small picking the next year, and the season following will produce at least a half crop. The third and fourth years are the very best, after which they begin to decline, and should soon be removed. However, on good soil and with proper care, and some fertilizer, plants have produced profitably for seven years.

Any of the soil of Hood River Valley will produce good berries, equal claim being made for the excellence of those grown on sandy or clayey soils. Clover sod well turned under and properly worked makes a most excellent plant bed and furnishes food material for plant growth; besides, the clover has a tendency to choke out weeds, and leave the soil free from this abominable nuisance.

HABITS.

The vines, with proper care, grow to a good size, however, not as large as some of the softer fruited varieties. The fruit is large, of good shape, rounded, and remarkably smooth; the color is a dark, rich red, red to the core. They are of fine texture and extremely firm and slightly tart in taste. The fruit is borne on rather long, stiff stems, thus keeping it clean and free from dirt. The berries are most excellent canners, retaining their shape, dark red color, and delicate flavor to a greater degree of perfection than those of a softer nature commonly grown for nearby markets.

The Clark's Seedling is not an exceedingly heavy bearer, the average crop being about one hundred crates of twenty-four pounds each per acre. Many other varieties will produce much more heavily, but the crop is valuable on account of always being in demand, and producing well year after year, and it has the habit of producing a valuable crop each year.

CHERRY CULTURE IN HOOD RIVER.

By G. D. WOODWORTH.

Growing cherries for profit in Hood River, and in talking about them, I will confine myself to my own farm. The soil is a black, heavy loam with a little gravel mixed in—just enough to make it work free and not stick to the tools.

I have four varieties that I grow for market—Lambert, Bing, Royal Ann, and Black Republican. I prefer the Lambert above all others, and I consider it the "king" of all cherries so far introduced. I have shipped them to London, England, by open express, and they arrived with only 18 per cent loss. While the Bing and Black Republican are good shippers, they will not carry as well as the Lambert. I have shipped all four varieties to Mexico City and Torreon, Mexico, New York City, and Nome, Alaska, with good results, as the following letter will show:

TORREON, Mexico, July 7.

Dear Mr. Woodworth:

I have been receiving your cherries for several days, and notwithstanding the long distance, I must say I never received better fruit here. Please accept my thanks for same.

Yours truly,

CARLOS STERNAN.

There is only one way to ship cherries, and that is to use the common sense carrier. Eight carriers or cartons fill the box, and by packing in this way the fruit is kept in place and is not shifting around in the box. Never put in, or allow any of your help to put in, any deformed fruit, or fruit that is cracked, for that is the first one to decay, and it will get soft and leak, thus spoiling all it comes in contact with. Do not put in anything that you would not want to buy yourself at 20 cents to 50 cents per pound. Men who try to cheat the consumer by putting inferior fruit in their packages only cheat themselves. Next, have a nice clean box make it look neat and tidy; get it to the consumer in the best possible condition.

To put up a ten-pound box of cherries it will cost you—box, 5 cents; eight cartons, 10 cents; packing, 5 cents; picking, 5 cents; crating, 2½ cents; paper, labels, and nailing, 2½ cents; in all, 30 cents. Now, if

you can get $1.25 to $1.50 f. o. b. railroad station, I don't think you will complain.

Now, as I have shown how to market the fruit, it will be well to tell how we grow it. I set out 1,500 trees; gave them thorough cultivation for the first four years. I thought that if cultivation was good for an apple tree it was good for a cherry tree; the consequence was I grew them too fast. The bark would burst and they would bleed to death. I have had trees make the enormous growth of eleven feet in one season. Then I pruned and cut them back, and that also was detrimental to the tree. It is my opinion, and in so far as my experience goes, you never want to cultivate after the first year. Seed your orchard down to clover and get two crops, and you will not have many dead trees nor any gumoses. Never put a saw or knife to a cherry tree unless it is to cut out a dead limb; for the wood of a cherry tree is not like an apple, it will not heal over, but will rot and the snow and rain will help it along. I set out 100 cherry trees three years ago along a fence where the ground never was plowed. The first year they did not grow much; the second year they did better; this year they have made a fine growth. They never have been pruned nor cultivated in any way. Two years ago I put out fifty trees; the first year I cultivated up to the first of July, then seeded down to clover. They have done fine, with a loss of only one tree.

If we will study Nature a little, we shall find that the cherry is first in bloom, first to fruit; and is all picked and marketed by July 10. The tree has borne its fruit; it has made its growth; the laterals have grown to their full length; the fruit buds are settling for next year's crop. Nature has performed her work so far as the cherry tree is concerned, and should rest until another year has come, when she will take up the same routine again. So, if we keep on cultivating and forcing the growth of the tree after it has fulfilled its duty, it is sure to bring disaster and ruin.

Now, a great many think all they have to do is to plant the tree and sit down and watch it grow, then pick the fruit—yes—but that is not the process that brings the best returns. It is not the kind that brings home the premium from the horticultural fairs, where men of knowledge and experience judge the merits of the fruit and quality is the only consideration.

If the cherry is worth growing, it is worth growing well, and I find the only way is to fertilize, and do it thoroughly; use plenty of potash, spray thoroughly in the winter with the lime and sulphur, also the bordeaux mixture. Keep your trees free from San Jose scale and all other insects pests and fungus, and you will surely have good results. I use the Niagara gas sprayer; it is always ready. It never gets clogged, and I believe it is the best machine on the market to-day.

Individual Exhibit at Hood River Fruit Fair, October, 1906

MARKETING FRUIT.

Read at Fruit Growers' Convention, Agricultural College, February 2, 1900, by J. T. Brumfield, Portland, Oregon.

Surely it is a great pleasure to be here and meet those that are interested in this great industry that has brought us together. It is the first convention of this kind I have had the pleasure of attending, and I assure you that I have enjoyed every word of the proceedings. The subject assigned is "Marketing." My first impulse was that something might be said on this subject that would be helpful to both grower and dealer. After thinking the matter over I was not sure that I was the one to do this, representing close-termed buyers. Whatever I may say is made up from personal experience in handling Oregon's dried fruit, and fearing some one may gain an impression that I had a selfish motive in view, I want it clearly understood that I am not here for selfish gains, but stand ready to take any course that is best for the interest of this industry. So let us bridge that awful chasm, which exists sometimes between the producer and dealer and separates them forever.

The subject assigned me is a wide one. It touches, either directly or indirectly, almost every phase, from the time our orchard is planted to the time the fruit reaches the consumer, but I am not capable, nor is it desired of me, to go into all of these matters, but rather to confine myself to a few points.

KINDS OF DRIED FRUITS IN DEMAND.

There being only two varieties of prunes produced in large quantities we will consider these only at this time, the Italian and Petite. I know the Italian is the pride of the Northwestern producers. Surely this beautiful specimen is rightfully entitled to much consideration, being especially adapted to this locality and probably the most profitable to grow. It is our place to hold up its good qualities, for the Italian has been the favorite of the local consumer, and is now reaching its way out into Europe. A few years ago the Easterner did not want them because of their tartness, now he wants them because they are tart. Only a few days ago one of the largest dealers in the East told me there was a special demand for the Italian prune. This is all true and encouraging for the owner of Italian orchards. But let us not forget that this fall the great production of prunes is of the sweet variety, commonly called Petites. Consumers are accustomed to use them. A large percentage of the consumers take a sweet prune.

Again, as a matter of enonomy, they are cheaper because they require less sugar. As to the comparison of our varieties with California, my experience has been that usually we produce as good a sweet prune as

they do. We have all heard a great deal about "Santa Clara." I tell you we hauled off the 1898 crop as nice a lot of Petites as California produced. The stones were a little larger, but the prunes were far better in flavor. Now as to the question of which of these two varieties you want to grow, or which is most profitable, that rests with you only. This suggestion does not cut out the Petites entirely; they are the staple of all prunes. New varieties do not take in the market.

GRADING.

This is simple and easy; every one knows how, but very few do it as it should be done, judging from the complaints that are continually arising. Can anything be said on this point that will help? Knowing how to do a thing, and doing it, are widely different propositions. I have known growers to start in grading a lot, say, fifty tons of prunes. The first bins they would test, leaving the whole lot on a basis of these few tests. Graders are not always perfect. A slight increase in speed or a slight difference in the outside moisture of the fruit will change things so that when the fruit gets into the hands of a particular dealer he finds that his grades are all off. You can not afford to leave open any point for the buyer to complain. Therefore, test every sack if necessary, and put them in the grade they belong. What position does the buyer take in this matter? If A sells B fifty tons of prunes graded 40 to 50, what will he expect to average? Looking at it from your standpoint, and you want matters to work smoothly, and are not looking for trouble, you had better give him an average of forty-five if he is a good fellow and the market is in his favor. If they run forty-six or forty-seven he may not kick. Personally, I have done a great deal of business on the plan of stating exact sizes, say forty-seven or larger, and sometimes forty-eight, and then selling on the same base. We have not had much trouble with our Eastern buyers; most of them have been liberal with us, not always holding as to the exact average, but as said before, no risk can be taken. Every grower should provide himself with a pair of accurate scales for this purpose. When you offer your stock give the size you have.

PACKING.

This is a question that has been discussed pretty thoroughly, and some severe criticism has been made, but mostly by people who know nothing about the requirements. I favor boxing, for the reason that the goods carry much better. On the other hand, there is a large demand for sack goods which must be supplied. The demand for sacks is strong for two reasons; they are cheaper, and again it gives the Eastern merchant an opportunity for doing his own boxing. Prunes packed in boxes do not show up bright and nice after being packed very long. Boxing is quite expensive on this coast, and it is to the interest of the grower to market his product as cheaply as possible. California packers charge a quarter of a cent only above sacked prunes in fifty-pound

boxes. Of course this is not fancy packing. If the trade requires fancy packing, then give it, but do not insist as some do on packing in boxes whether a buyer wants them or not.

PRICES.

I know you do not expect me to tell you how to always realize good prices; I wish I could. So far this question has not been settled to any great degree of satisfaction. So the question remains open, for us to discuss the points that will tend to better conditions. The old and many times stated conditions of "supply and demand" enter in largely.

First, let it be known that prunes are not a table luxury; they are a staple food commodity. I do not say they are not eaten by the better class, for they are, but the greater portion is consumed by people of moderate means. I believe that "demand" plays the greatest part in this question with financial matters right and the consumer's pocket-book in good condition. Then let it be known that prunes are a good and economical table fruit. You need not fret about over production. I do not believe the consumption of prunes is as large as it should be. The product for the past two years in the country will not exceed one pound per capita. Without a doubt something is out of joint; either prunes are not liked or housewives do not know what they are. I think the main cause is lack of being introduced. In many localities they are considered a luxury, and in some districts they are not known at all, but we are glad to note consumption is increasing. There is an opportunity for some good work in introducing these goods in the Southern States. Europe is taking them freely, and one-fourth of the California crop has been exported this year. With the close commercial relations with all the world you need not be afraid of overproduction, in fact we are just beginning to produce enough to let the world's market know there is an Oregon and Washington. It is better to produce a quantity that will give us a part in the world's market than only a few, or not enough to be known. Markets will always look where there is an ample production. Again, the Government is buying largely for army and navy supplies—a good argument for the growing popularity of the Oregon prune. Coming back to the question of demand and supply—since coming to the convention a grower told me that he found places in the East where 15 to 20 cents per pound were obtained in a retail way, and in one case 30 cents. This is robbery. If this exists to any extent you need not expect to sell your prunes at 4 to 5 cents, for the forty-to-fifty pack on this Coast can be sold to the consumer at 10 cents or three for 25 cents. They can be sold in Europe at 12½ cents, or at 10 cents straight. The price of prunes should be kept in a comparative ratio with other fruits.

PRESENT CONDITIONS.

Selling.—To say anything on this subject is treading on sacred ground. Every producer should meet the existing conditions to the best

of his ability. It is the privilege of every grower to sell his fruit when and where he pleases, so I do not want any one to be influenced by what I say. The last two years my observation leads me to believe some of the growers exercise poor judgment along this line; whether it is from lack of current information regarding the market conditions or indifference, I am not able to say. Entirely too much stress is laid on crop reports. Early last season we were not able to do much business because the grower held out the argument that our crop was a failure, and our supply would no more than equal the local demand, forgetting that California had a very large crop. Freight from San Francisco to Portland was only 10 cents per hundred pounds, putting San Francisco on a better footing than most of the valley points.

Contracting Early.—I know you will not agree with me on this point, nevertheless it is an important matter. In 1888 75 per cent of our sales were made before drying was completed, in fact, we bought largely when the fruit was on the trees. A very able editorial appeared in the *Oregonian* pertaining to this matter. The writer held out the argument that a producer was not a speculator, referring to the hop man. Well, I do not know much about hops, but the system of selling ahead is largely practiced, and if we want to get the best results when we have an inquiry for such contracts some consideration must be given them. We are living in a fast age. I wish such conditions did not exist, but they do in all lines, and let us meet them. There is some advantage for the Eastern buyer to contract, aside from the speculative price view. Our crop comes in a little behind California, and if we get this business we must make prices. It gives the Eastern dealer an opportunity to work his trade and secure orders for immediate shipment on arrival, gets the goods into the hands of the consumer early, and is in many ways better for the dealer. As to the producer, he takes the chances as to prices being better later on. Our experience is that early sales are the best. There is an enthusiasm when the new crop arrives in the market that must be supplied.

HOPS IN OREGON.

By A. J. RAY.

A paper read before the Oregon State Horticultural Society.

While it may be said that a horticultural meeting is hardly the place to discuss the subject of hops, the fact that it has grown to be one of our largest industries, and that there is no society here which treats of the subject, will be my excuse for offering these remarks.

As is well known, hops have been cultivated and used in the manufacture of beer for several hundred years. First in Germany, then England, from where they were brought to New York about two hundred years ago.

The cultivation has spread from New York, first to Wisconsin, and then to the three Pacific States, but on account of low prices, pests and natural decrease in yield, Wisconsin has abandoned hop culture, and New York, which in 1904 grew 200,000 bales, now produces about 60,000. The Pacific States have taken the place of these Eastern States, so that now we grow five-sixths of all the hops grown in America.

A description of the methods of planting, cultivating, curing, etc., would take too much time, so I shall only allude briefly to these points, and discuss those subjects that appear to offer the best chance for improvement of conditions now existing.

Hops may be roughly divided into three varieties, Green, Red, and Yellow, represented here by the Early Fuggle, Canada Red, and English Cluster. The Fuggle is an early variety, being ready to harvest about two weeks before the other kinds. The demand for this variety is, however, rather limited, and our production does not exceed 2,000 bales. The Canada Red is a rather rough looking, but fine flavored hop. It is not a heavy yielder and is a few days later than the Cluster; for this reason but few are grown here, and these chiefly mixed with another variety to impart flavor. The Cluster is our hop of commerce. It is a heavy yielder, going some 1,500 pounds per acre on good soil and cultivation.

The production of hops in America in 1905 was about 300,000 bales of approximately 200 pounds each. Of this quantity our domestic breweries used about 225,000 bales in the manufacture of 55,000,000 barrels of beer; almost a barrel for each of us. England takes our annual surplus, and we are building up a considerable export trade to China, Japan, and Australia.

There is perhaps no product of the soil in which there is so wide a range of prices, due doubtless to the fact that there is but the one use for hops, and therefore a year of large yield above the consumption shows prices below cost of production, while a year of scarcity jumps the price to $450 per acre of average production.

The life of a hop yard is indefinite, but it is enough to say that there are yards in England over one hundred years old. With us it is necessary each year to replant scattering missing hills, which have become diseased or torn out by the plow.

The practice here is to plant our vines in an eight-foot square, with the rows running north and south, so the sun can strike all parts of the vine. We train from two to four vines per hill, spreading the vines when they reach the wires, nine feet above the ground. My opinion is that a yield would be greatly increased by planting four by eight feet and two vines per hill.

Until about the year 1900 hop pests were unknown on the Coast, but, like the fruit pests, they found their way here and have been the source of enormous loss and great additional expense in the production of a crop. Practically the only pest which we have to combat is the hop

louse, which are said to hybernate on the plum trees and migrate to the hops in May or June. The only effective remedy so far discovered is a spray of quassia and soap, but this must be very thoroughly done. This pest attack the leaves and vines and later enter the hop cone, where either their excretance or their dead bodies start a fungus mould to grow, which soon envelops the entire cone.

The red spider has lately arrived, but as yet has not appeared south of Puyallup.

The experience of other hop-growing sections is that there will be a constantly decreasing yield unless the ground is fertilized; and this, with the ingredients taken from the soil by the hop. The average annual production per acre here is not two-thirds of what it was fifteen years ago, and is constantly declining, until we now actually grow less per acre than is produced in England, where they have taken hops from the same soil for one hundred years.

Potash, phosphoric acid, and nitrogen are the requirements for hops, but some judgment should be exercised in the use of fertilizers, for as a rule our ground needs no nitrogen and not a great deal of phospate, but a liberal treatment of potash is abundantly repaid. It is quite an easy matter to produce an average crop of 1,500 pounds per acre on our ordinary soil at an expense of $5 to $10 per acre for fertilizers. Manure is a good fertilizer, but it induces too rank a growth of vines and also contains so many weed seeds that the cost of keeping the weeds down and of hauling and spreading it on the ground exceeds the cost of the commercial fertilizers. I always mix my own fertilizer and sow it broadcast before the first spring plowing.

It seems that we have reached our picking capacity in this State, and it is doubtful if any material increase in the production in Oregon will be made for many years. In fact, it is likely to decline after the year 1907, for the reason that we are approaching an era of low prices; prices below the cost of production, and which will likely continue for several years, resulting in a decline in the production. While such a time is very hard for us to bear, it is still harder for those in the East and in Europe, where the rents are so very high. These periodical eras of low prices have resulted in reducing England's acreage over two-thirds, as well as New York's, before mentioned, and as our soil and climate are perfectly adapted to its growth, it seems likely that before many years this Coast will grow practically all the hops used in America and England, but before we can pick them we must provide comfortable quarters for pickers, so they can live respectably and earn enough to make the employment attractive. We can greatly improve in our picking by getting cleaner picking done; in curing by keeping our heat low and uniform and by having a free escape for the moist air; in baling by doing no tamping in the press; in the production of a hop rich in lupulin by the use of phosphates and potash, and a fine yellow color by spreading the hops to the rays of the sun.

If we can produce a cross between the Fuggle and Cluster, so as to bring our hops on ten days earlier, we would accomplish a great thing, for, as it now is, we are always caught in the midst of harvest by heavy rains and often, as this year, by a late attack of lice, which can not be fought, because they enter the burr out of reach.

For the past three years I have irrigated one of my hop fields, containing thirty acres, during early July, by means of a centrifugal pump and a threshing engine, which threw a stream one foot wide and deep continuously for one week. This water was conducted in furrows between each row and allowed to soak the soil. Although this field was on bottom land, which would not be supposed to require the water, we found the effect to be wonderful, for although done rather too late each year, it nearly doubled the yield, and the expense per pound was trifling. There are hundreds of yards which are well situated for irrigating here, which would find a good wetting at blossoming and burring time very profitable.

Having finally gotten his hops into the bale, the grower is ready to sell, and here he finds a situation of complete pandemonium, for each farmer competes with his neighbor in his effort to sell, with the result that the market is soon demoralized. If the crop could be sold under some such organization as exists with the Hood River apple men much more satisfactory results would be realized, and the trade is awaiting the man who can successfully organize the hop growers so that they may sell with at least a little judgment.

HINTS ON HOME DECORATIONS.

By E. P. DREW, Oakland, Oregon.

The use of shrubs and plants, tastefully arranged, increases the value of the home greatly, both as a money value and for association. Most of us can remember the trees and flowers of our childhood, but fail to remember the house as well.

There is no rule to guide us in laying out a plantation, only keeping in mind the habits and growth of such plants as we intend to use, always setting the farthest back the strong growers, planting the dwarf sorts nearest the view, so as to extend the view apparently to the eye. Single specimens on the lawn should be of the very best, as a mistake creates a bad impression. A few of the best for this purpose are: Cut-leaf Birch, Weeping Beach, Weeping Willow, Camperdown Elm, Weeping Mountain Ash, the upright Juniper, Golden Yew, Colorado Blue Spruce, Dwarf Arber Viteas, Variagated Cypress. All these are easy to grow requiring only the care you would give in planting out a fruit tree in good shape.

The Japanese variagated maples are also good. Care, however, must be taken to plant them so they will be in shade during the middle of the day, or the leaves will burn. There is nothing prettier in colored leaves when well grown. A bed of roses, Cannas, Hardy Phlox, Azaleas, or Rhododendrons, with a border of Azaleas, is very appropriate. Hardy Phlox pinched back is second to none when in flower, or it can be used as a border of flowering shrubs.

Rhododendrons require a special bed of muck, or soil enriched by one-half cow manure with a mulch of leaves or rotten wood. To prepare the bed, remove the soil at least one foot in depth, fill in the prepared soil, set the plants, water, then cover at least four inches deep with mulch. These plants are worth all the trouble you can give, and more. Our native Rhododendrons can be moved by digging around the ones to be moved and cutting back the roots a year before the plants are to be transplanted, cutting a foot or more from the stem. This applies to Azaleas as well. Lilies can be planted in the Rhododendron bed, which gives a beautiful effect. In choosing trees for the front lawn plant to set off the house, not to hide it. If you wish to hide the house, use vines freely. Ampelopsis Veitchii, Quinquifolia, Passion vine, or Irish Ivy, will do so the quickest. They are good also to cover outbuildings. Vines to break the bearness of the house and enrich its architectural features are the climbing roses, chief among which are Crimson Rambler, Climbing Cap Christay, and Marechal Niel, Clematis Paniculata, Jackmanii, Ramona, Henrii are good. Care in planting to spread out the roots and tramp the soil over them hard, will insure transplanting. Among other vines used for this purpose are Akebia Qumata, Tecomas, Wistarias, and honey suckles.

In planting the sides and rear, grooping is far preferable to a miscellaneous jumble of plants planted anywhere, which look as if they were sowed broadcast and planted wherever they fell. Better by far to mass them against the fence, always planting the tallest growing back. There is a large variety to choose from; the best among them are Weigelas, Viburnoums (Snow Balls), Spireas (Bridal Wreaths), Mock Orange, Lilac, Magnolias, Hydrangea, Hibiscus, Fringe, Golden Bell, Exochorda, Spindle tree, Dentzias, Laburnums, Flowering Crab, Kerria (Corchorus), Berberrys, Privet, Desmodium, Cydonias, Azaleas, Rhododendrons, Althea (Rose of Sharon), Aralia, Holly. In massing, draw the line for the beds most any shape, avoiding sharp corners; then set stakes three to five feet apart, where plants are to set. If evergreen beds, set farther apart. Spade well-rotted manure in the beds before holes are dug. If convenient, water well, but only at sundown. All are of easy culture, pruning out the dead wood only unless well versed in this work. Yuccas can be planted along walks before shrub beds near the fence, anywhere except in deep shade.

Palms that will ordinarily stand the winters in Western Oregon are Chamerops Excelsa, Phoenix, Washington Filifera (California Fan Palm), and Robusta, also Dracines Indivisa.

Red Raspberry Picking at H. J. Mickelson's, Montavilla, Oregon

Perennial plants are pretty planted close to the house or along walks or fences. The best are Achillea (The Pearl), Anemone Japonica, Arundo Donax, Campanula Carpatica, Columbine, Chrysanthemum, Coreopsis Lanceolato, Delphinum Formosum, Eryngium, Funkias, Gallardia Grandiflora, Helenium Hoopesi Helianthus Maximiliani, Hibiscus Crimson Eye, Holly Hocks, Iiris, Lychnis Viscaria Splendens, Lythrum Ruseum, Paeonias, Hardy Phlox, Platycodon, Spires Japonica, Yucca. The following grasses should be planted by themselves: Arundo Donax, Erianthus, Eulalias, Bamboo. Arundo and Bamboo require considerable water; the edge of a pond or creek is an ideal situation.

Silver maple and European sycamore are the most rapid growing except Carolina popular, but to be useful as well as ornamental walnuts, cherries, or others from which an income can be derived, are best, especially on the farm. Elm, maple, oak, catalpa, linden, are very good, but in growth are too slow for a street tree. Evergreens only do well when the space between curb and walk is wide. Elm should never be set near tile drain, as the roots will completely fill the tile in a few years.

The cost per plant for shrubbery of a medium size should not exceed 25 cents, except for rare kinds, as Azaleas, Rhododendrons, Japanese maple, and fine varieties of evergreens, which are hard to propogate, also new varieties. Roses at 35 cents are profitable to the nurseryman, and should never exceed that except for new kinds. Street trees, which also mean shade trees, are sold according to size. Those who can afford to do so, can get plans of their plantations drawn by experienced landscape architects at a small cost. It will be cheaper and more satisfactory and the planting will look artistic when finished, especially when on a large scale.

BLACK RASPBERRY CULTIVATION.

By JOSEPH HALL, Newberg, Oregon.

This section of the Willamette Valley in the vicinity of Newberg and Springbrook, Yamhill County, is very favorable for the cultivation of black raspberries, which is proving to be a very profitable industry just now. But very little interest has been taken in this branch of fruit raising here till within the past four or five years, especially since a cannery was built at Springbrook. The business is now on the increase. We have in the surrounding county near by about twenty-five acres bearing. The soil seems to be all right, both in valley near the river and on side of the mountains near by, and on the farms on top of the mountain—Chehalem Mountain. The clay loam and the red soil will both produce well. Light soils, sandy, etc., dry out too soon, hence not suitable.

Variety.—Gregg. Two varieties here, both called Gregg.

Planting.—Land well prepared before setting. Set tips if possible; set in February, March, or April. Place them in rows eight feet apart and four feet apart in row. Keep clean from weeds and grass, the same as strawberries. Plow, cultivate, harrow, and hoe, and they will bear for five or six years well. The tip ends of the plants of the first year's growth will rest on the ground. If new plants are desired, soon after the first rains in September or October, go along with a hoe and cover the tip end with soil one-half to one inch deep. These will root and give new plants for setting the latter part of winter or spring.

The second year, when the new shoots are from eighteen to twenty-four inches high, clip off the top; this will cause them to branch and form a tree. Some clip these branches again when they have grown two or three feet, in August, and some leave them till spring and cut back just as they wish them to bear. Permit only from four to six shoots, or canes, to grow in a hill. Never cut back a cane to two feet after it has grown to be four or five feet high. Clean all of the old canes out in fall or winter.

Picking.—Here is the only drawback. Slow work. Many berries went to waste this year for want of pickers. We can raise the berries to perfection, but let no one conclude that they can run or manage a few acres till they know where the help is coming from. It requires about four to five persons per acre to gather them. The price paid for picking is from 1 to two cents per box or pound. The picking lasts about three weeks.

Here the berries are sold to the canning company at 4 cents per pound, or dried. At present prices it pays better to dry them. For the past five or six years dried berries have sold for 16 to 18 cents per pound, delivered at railroad station here. This year they were 22½ cents. A crate of twenty-four pounds will give from six and one-half to eight pounds dried. This varies with the season. This year 600 pounds produced 200 dried for me.

In this climate they are easily dried. For the past seven years I have dried nearly all of the berries raised on two acres, in the sun. Place them on trays made of lath, three by four feet, covered with cloth, and in about three days they are ready to gather in. The trays will last for years if cared for. They are easily dried in a dryer. Do not dry them too hard. When dry, if you have many, put them in a pile, and shovel them over about twice a week till you are through drying the crop. Procure sugar sacks, both inside and outside sacks, sack them as sugar is sacked, and they are ready for market.

When removed from drying trays, pick out all stems and leaves. There is a ready market for such fruit every year.

This year the cannery at Springbrook canned about 21,000 pounds of fresh berries, and there were about two tons of dried berries shipped from here at $450 per ton.

This year the average income per acre was not far from $100. Some more and some less. Where they were well cared for and all gathered

$125 and over per acre was realized. Some think that they can be made to yield $150 per acre. If all of the berries could have been gathered the average would have been much higher. The black raspberry is a fine fruit, easily cared for, and when dried always demands a good price. No fruit ranch here is complete without them. The size of the patch is to be governed by the ability of the parties to gather them.

PRELIMINARY REPORT.

(As corrected by H. E. VAN DEMAN.)

Committee on Score Cards of American Pomological Society Preamble.

The committee understands that its first duty is to provide score cards suitable for judging fruit at fairs and exhibitions. The score cards herewith presented deal therefore with the quality of fruit only. In order to arrive at an estimate of the value of any particular variety, it is necessary, of course, to consider also the qualities of the trees, or vine, such as hardiness, productivity, etc. This is another matter, and one which the committee has reserved for future consideration.

In judging fruits at exhibits, it is commonly necessary to compare different samples of a single variety with one another, as for instance, which is the best of several plates of Elberta peaches. The fruit grower himself, however, often wishes to compare one variety with another, as for instance, which is the more desirable, the Elberta or the Late Crawford. The two problems are essentially different, but the cards herewith presented are designed chiefly with a view to assist in the solution of the former.

For the purpose in hand, it is deemed essential that the score cards should be simple and easily workable in the hands of a juror of average intelligence. It is possible to make much more elaborate score cards than these presented herewith. Such elaboration is very desirable in some cases, but it is a drawback rather than a help in scoring fruit at exhibitions.

For the same reason it is deemed necessary to use only a small number of score cards for each class of fruit. Two score cards are recommended for apples, and three for grapes. The committee recognizes that there may be many other legitimate ideals, and that such ought to be encouraged; but it is not thought practicable to present these ideals in score form for general use at the present time.

Nevertheless, the committee considers it essential to make some distinction between the varieties of fruit in any one class. The distinction between commercial and dessert apples, for instance, is regarded as necessary. The qualities which make a successful commercial variety are evidently different from those which make a desirable dessert variety. It would be manifestly impossible to judge one according to the standard provided for the other.

A special case, somewhat of this sort arises in judging oranges. Orange growing in California and Florida, respectively, is controlled by two widely different ideals. The committee believes that both of these ideals are legitimate, and that both should be recognized. For this reason two score cards for oranges have been recommended.

Many explanations regarding the use of these several score cards might be given, and doubtless would assist materially in their use. Such explanations, however, would be burdensome in this preliminary report. The committee hopes to do this in the final report as published by the A. P. S.

It is understood throughout this work that score cards and scales of points are intended to assist the judge, not to take his place. They may help him in making his opinion, but they are not submitted for his expert knowledge, nor should they interfere with his exercise of it. With or without a score card, a good fruit judge must know something about fruit, and must have a good judgment with regard to its qualities.

The score cards as recommended follow herewith:

SCORE CARD FOR COMMERCIAL APPLES.

Form	10
Size	20
Color	25
Uniformity	15
Quality	10
Freedom from blemishes	20
Total	100

SCORE CARD FOR DESSERT APPLES.

Form	10
Size	10
Color	15
Uniformity	15
Quality	30
Freedom from blemishes	20
Total	100

NOTE.—For scoring pears two different cards are to be used, in all respects like those used in scoring apples.

NOTE.—The same cards should be used also for scoring quinces, except that, from the nature of the fruit, the commercial score card would nearly always be the one chosen.

SCORE CARD FOR COMMERCIAL PEACHES.

Form	10
Size	20
Color	20
Uniformity	20
Quality	10
Freedom from blemishes	20
Total	100

SCORE CARD FOR DESSERT PEACHES.

Form	10
Size	10
Color	15
Uniformity	15
Quality	30
Freedom from blemishes	20
Total	100

SCORE CARD FOR COMMERCIAL PLUMS.

Form	10
Size	20
Color	20
Uniformity	15
Quality	15
Freedom from blemishes	20
Total	100

SCORE CARD FOR DESSERT PLUMS.

Form	10
Size	10
Color	15
Uniformity	20
Quality	25
Freedom from blemishes	20
Total	100

SCORE CARD FOR COMMERCIAL CHERRIES.

Form	10
Size	20
Color	20
Uniformity	15
Quality	15
Freedom from blemishes	20
Total	100

SCORE CARD FOR DESSERT CHERRIES.

Form	10
Size	10
Color	15
Uniformity	20
Quality	25
Freedom from blemishes	20
Total	100

SCORE CARD FOR COMMERCIAL GRAPES.

Bunch.

Size	15
Form	10

Berry.

Size	15
Color	15
Bloom	5
Flavor	10
Carrying quality	15
Freedom from blemishes	15
Total	100

SCORE CARD FOR DESSERT GRAPES.

Bunch.

Form	10
Size	10

Berry.

Size	10
Color	10
Bloom	5
Flavor	25
Quality of pulp	15
Freedom from blemishes	15
Total	100

SCORE CARD FOR WINE GRAPES.

Bunch.

Form	5
Size	10

Berry.

Size	10
Color	20
Bloom	5
Flavor	30
Quality of pulp	10
Freedom from blemishes	10
Total	100

SCORE CARD FOR CALIFORNIA ORANGES.

Size	10
Form	5
Color	20
Weight	15
Peel	10
Freedom from fibre	10
Seed	5
Flavor	25
Total	100

SCORE CARD FOR FLORIDA ORANGES.

Size	10
Form	5
Color	15
Weight	20
Peel	10
Fibre	10
Seed	5
Flavor	25
Total	100

SCORE CARD FOR LEMONS AND LIMES.

Size	10
Form	5
Color	15
Weight	15
Peel	10
Fibre	10
Acidity	25
Seed	5
Flavor	5
Total	100

SCORE CARD FOR POMELOES.

Size	10
Form	5
Color	15
Weight	15
Peel	10
Fibre	10
Seed	10
Flavor	25
Total	100

SCORE CARD FOR COMMERCIAL STRAWBERRIES.

Size	15
Form	5
Color	20
Texture	5
Firmness	20
Uniformity	20
Quality	15
Total	100

SCORE CARD FOR DESSERT STRAWBERRIES.

Size	10
Form	5
Color	15
Texture	10
Firmness	10
Uniformity	10
Quality	30
Aroma	10
Total	100

NOTE.—Raspberries, blackberries, and dewberries are to be scored the same as commercial strawberries.

SCORE CARD FOR CURRANTS.

Size of bunch	15
Form of bunch	10
Size of berry	20
Uniformity	10
Color	20
Quality	25
Total	100

SCORE CARD FOR GOOSEBERRIES.

Size	20
Form	5
Color	15
Thickness of skin	10
Texture of pulp	10
Uniformity	15
Quality	25
Total	100

SCORE CARD FOR PERSIMMONS.

Size	15
Form	10
Color	15
Seeds	15
Uniformity	15
Quality	20
Freedom from blemishes	10
Total	100

SCORE CARD FOR COMMERCIAL PECANS.

Size	20
Form	5
Color	5
Thinness of shell	10
Cracking quality	20
Plumpness of kernel	20
Color of kernel	5
Quality	15
Total	100

NOTE.—In the absence of any better score cards the pecan scale may be used for walnuts, hickories, and similar nuts.

APPLE CULTURE.

By G. R. CASTNER.

In the spring of 1894 I landed in Hood River, on the 29th day of March, having seen the apples on display at the Columbian World's Fair at Chicago in the fall of 1893. I quit railroad work and came to Oregon to engage in fruit growing. After looking about the valley for two weeks I decided on my present location, there being six acres of clay loam that had been lately cleared, having had one crop of corn, followed the same fall by a crop of winter barley, leaving the ground in perfect shape for setting trees. I made my selection of trees as follows: Three hundred and forty Newtowns, fifty Spitzenbergs, fifty Ben Davis, eleven King of Thompkins County, and a few other home varieties. The trees arrived and I set them the last week in April, and have learned since that they were watched closely by my neighbors, as they expected to see me lose a great portion of them by setting so late, but strange to say, I did not lose one, and found only one at bearing time not true to name. I used care in setting, digging the holes nearly three feet across and two feet deep, carrying a large tobacco pail of water and dipping the roots of every tree before setting. I set them twenty-two feet apart each way, but now wish I had made them twenty-five feet. I planted corn between the rows for five years, raising plenty of corn to fatten hogs and feed stock; since then I have grown nothing in the orchard, but practiced clean cultivation. The trees were good yearling trees, and I headed them down to three feet, having set them about three inches deeper than they were set in the nursery. The following winter we had quite a deep snow, and many of the lower limbs were stripped by snow settling, so I was obliged to make the head of the tree from branches that were left near the top. I would prefer to commence head about twenty inches or two feet from the ground. I headed back all trees the second year, but since then have pruned to balance trees against the wind only and to take out crosses. I had some fruit the fourth year, more the fifth, and the sixth year had a good crop, and have had an increase each year since, selling the Newtowns last year for about $1,600.

In setting the orchard I set the Newtowns on the west, the Spitzenbergs next, and the Ben Davis next. In the winter of 1896-7 I lost twenty-eight Newtowns from the November freeze, and replaced them with Baldwins and Spitzenbergs, and since then I have replaced until I have only 306 of the original Newtown setting left; of this number 220 bear each year, those bearing heavily the previous year resting the succeeding year, and vice versa. The Spitzenbergs have never borne heavily, as the location is somewhat exposed to the wind, and my ex-

perience is that Spitzenbergs should be well protected from the wind to get the best results.

The Ben Davis have borne each year since the fourth year, and only one year has their yield been a light one. The location of the orchard is west of Phelps' Creek on a northeast slope and well drained naturally. The sub-soil is clay and underlaid with volcanic rock which slacks as soon as exposed to the air. I spray once a year with lime and sulphur and bordeaux for protection from scale and fungus, and five times each year for codling moth, the first spray as soon as the bloom has nearly all fallen; the second ten days later, and the other three thirty days apart, using the arsenate of lead spray, which has proven the best spray for protection against the codling moth of any ever used in this valley. Since using it have only about one per cent of wormy fruit.

FRUIT GROWING AT SUMMER LAKE AND PAISLEY, OREGON.

Written for this report by A. A. WITHAM, M. D., Paisley, Oregon.

Along the western shore of Summer Lake, Oregon, there are several orchards of thriving trees; apples, pears, plums, prunes, peaches, cherries, producing, in quantities not to be excelled by the same number of trees in any portion of the State, in quality, the very best fruit. Not a pest of any kind has as yet attacked either trees or fruit. Many new orchards are being planted; in fact, almost every farmer is either setting a new orchard or increasing the acreage of an old one, for it has been demonstrated by practical tests that this is one of the best fruit-producing sections in the State of Oregon.

Apples of the following varieties have been successfully produced for the past ten or fifteen years: Jonathan, Arkansas Black, Ben Davis, Spitzenberg, Baldwin, Rhode Island Greening, Bellflower, Rambo, Wealthy, Walbridge; in short, all Russian stocks or Russian grafts do excellently well. In summer and fall varieties, the Red Astrachan, Yellow Transparent, Red June are among the most favored.

All pears seem to do well, notably the Bartlett, Clapp's Favorite, Flemish Beauty. Cherries, such as the Lambert, Baldwin, Royal Ann, Bing, grow to perfection. The peaches of this region are noted for their excellent flavor. The Early Alexander, Yellow Crawford, Large Early York, Champion, Foster, and Triumph have demonstrated their fitness for this climate. All varieties of plums and prunes do well, for [illegible] the natural habitat of the plum family. The wild plum is in[illegible]s and grows in rich profusion all along the lake shore, and up [illegible]nyons and ravines leading to the rimrocks surrounding the lake.

Owing to the lack of transportation facilities the market is strictly local, hence prices vary with the crop. This year apples sold for $2 to $2.50 per hundred pounds; plums for 2 cents to 3 cents per pound; peaches 4 cents to 5 cents. Pears usually bring from 2 cents to 4 cents. The only protection against cold used so far is the planting of poplar trees around the orchards. They serve also as a protection against wind.

INDEX.

A

PAGE

Annual Address, Dr. J. H. Cardwell, President Oregon State Horticultural Society.. 172
Apple Culture, G. R. Castner 241
Apple, Picking, Packing and Marketing the, Prof. Lowell B. Judson 197
Apple Scab, Prof. A. B. Cordley 98
Apple Tree Anthracnose, Prof. A. B. Cordley 90
Apple Tree Pests, Some, Prof. A. B. Cordley, Oregon Experiment Station 64
Apple, The, From Nursery to Packing Table, A. I. Mason 210
Armstrong, E. C., The Duties of County Fruit Inspectors 169

B

Black Raspberry Culture, Rev. Joseph Hall 233
Broetje, J. F., The Grape in Oregon 154
Brumfield, J. T., Marketing Fruit 225

C

Cardwell, Dr. J. R., The Fruits of the Land 124
Cardwell, Dr. J. H., Annual Address as President of the Oregon State Horticultural Society 171
Carson, A. H., Reports as Commissioner for Third District 30, 32, 34
Castner, G. R., Apple Culture 24
Cherry Culture in Hood River, G. D. Woodworth 223
Cherry, The Commercial Side of, H. S. Gile 166
Cherry in Oregon, The, M. McDonald 164
Codling Moth, The, Prof. A. B. Cordley 64
Collingwood, H. W., The Mulch Method of Orcharding 158
Commercial Side of the Cherry, The, H. S. Gile 166
Cordley, Prof. A. B., Some Apple Tree Pests 64
County Fruit Inspectors, The Duties of, E. C. Armstrong 169
County Fruit Inspectors, Act Providing for 111

D

Dosch, Henry E., Walnut Culture 187
Drew, E. P., Hints on Home Decoration 231
Duty of the Fruit Grower, The, A. I. Mason 150
Duties of County Fruit Inspectors, The, E. C. Armstrong 169

E

Early Horticulture in Oregon, Brief History of, Dr. J. H. Cardwell 121
European Grape in Oregon, The, E. A. Reuter 185
Economic Forestry, Edmund P. Sheldon 143
Evans, Howard, Report as Inspector of Umatilla County 60

F

PAGE
Filberts, Walnuts and, Felix Gillet 176
First Fruits of the Land, The, Dr. J. R. Cardwell 121
Fruit Growing at Summer Lake and Paisley, A. A. Witham M. D. 242
Forestry, Economic, Edmund P. Sheldon 143

G

Geer, Judd, Reports as Commissioner for Fifth District 53, 55
Gilbert, L. M., The Oregon Prune 183
Gile, H. S. The Commercial Side of the Cherry 166
Grape in Oregon, The, J. F. Broetje 154
Gillet, Felix, Walnuts and Filberts 176
Grape, The European in Oregon, E. A. Reuter 185
Grasle, J. W., To Grow Strawberries Successfully and for Profit 191

H

Hale, J. H., Mulch Talk 161
Hall, Rev. Joseph, Black Raspberry Cultivation 233
Hints on Home Decoration, E. P. Drew 231
History, Cultivation and Habits of the Strawberry in Hood River, C. D. Thompson 220
Holaday, Asa, The Home Orchard 162
Home Decorations, Hints on. E. P. Drew 231
Home Orchard, The, Asa Holaday 162
Hood River, History, Culture and Habits of the Strawberry in, C. D. Thompson 220
Hood River Methods for Better Prices, E. H. Shepard 192
Hops in Oregon, A. J. Ray 228
Horticultural Laws 107, 116

J

Judging Fruits, Preliminary Report on, H. E. Van Deman 235
Judson, Lowell B., Picking, Packing and Marketing the Apple 197

M

McDonald, M., Cherry in Oregon 164
Marketing Fruit, J. T. Brumfield 225
Marketing Picking, Packing and Marketing the Apple, Lowell B. Judson 197
Mason, A. I., The Apple, From Nursery to Packing Table 210
Mason A. I., The Duty of the Fruit Grower 150
Mobley, T. C., Report as Inspector of Gilliam County 63
Morris, J. T., Report as County Inspector of Sherman County 62
Mulch Method of Orcharding, The, H. W. Collingwood 158
Mulch Talk, J. H. Hale 161

N

Newell, W. K., Report as President 13
Newell, W. K., Reports as Commissioner of First District 25, 26, 27

O

Prune, The, L. M. Gilbert 183

P

PAGE

Packing, Picking and Marketing the Apple, Prof. Lowell B. Judson 197
Park, Chas. A., Report as Commissioner for Second District 102
Paisley, Fruit Growing at, A. A. Witham M. D 242
Picking, Packing and Marketing the Apple, Prof. Lowell B. Judson 197
Preliminary Report on Judging Fruits, H. E. Van Deman 235
Prince, Thos., Walnut Growing in Oregon 180
Prune, The Oregon, L. M. Gilbert 183

Q

Quarantine Regulations 117

R

Raspberry, Black, Cultivation, Rev. Joseph Hall 233
Ray, A. J., Hops in Oregon 228
Reports of A. H. Carson as Commissioner for Third District 30, 32, 34
Report of Howard Evans as County Inspector, Umatilla County 60
Reports of Judd Geer as Commissioner for Fifth District 53, 55
Report of T. C. Mobley as County Inspector, Gilliam County 63
Report of J. T. Morris as County Inspector, Sherman County 62
Report of W. K. Newell as President 13
Reports of W. K. Newell as Commissioner for First District 25, 26, 27
Report of Chas. A. Park as Commissioner for Second District 102
Reports of E. L. Smith as President 5, 10
Reports of R. H. Weber as Commissioner for Fourth District 44, 45, 48
Reuter, E. A., The European Grape in Oregon 185
Reynolds, L. T., Some Problems 174

S

San Jose Scale, Prof. A. B. Cordley 81
Sheldon, Edmund P., Economic Forestry 143
Shepard, E. H., Hood River Methods for Better Prices 192
Smith, E. L., Reports as President 5, 10
Some Problems, L. T. Reynolds 174
Strawberry in Hood River, History, Culture and Habits of, C. D. Thompson 220
Strawberry, To Grow Successfully, and for Profit, J. W. Grasle 191
Summer Lake and Paisley, Fruit Growing at, A. A. Witham, M. D. 242

T

Thompson, C. D., History, Culture and Habits of the Strawberry in Hood River 220

V

Van Deman, H. E., Preliminary Report on Judging Fruit 235

W

Walnuts and Filberts, Felix Gillet 176
Walnut Culture, Henry E. Dosch 187
Walnut Growing in Oregon, Thos. Prince 180
Weber, R. H., Reports as Commissioner for Fourth District 44, 45, 48
Witham, A. A., M. D., Fruit Growing at Summer Lake and Paisley 242
Woodworth, G. D., Cherry Culture in Hood River 223

New York Botanical Garden Library
3 5185 00259 9775